MINISTRY OF FORESTS

Okanagan Timber Supply Area

Integrated Resource Management

Options Report

Kamloops Forest Region
British Columbia Forest Service

October, 1990

Province of
British Columbia
Ministry
of Forests

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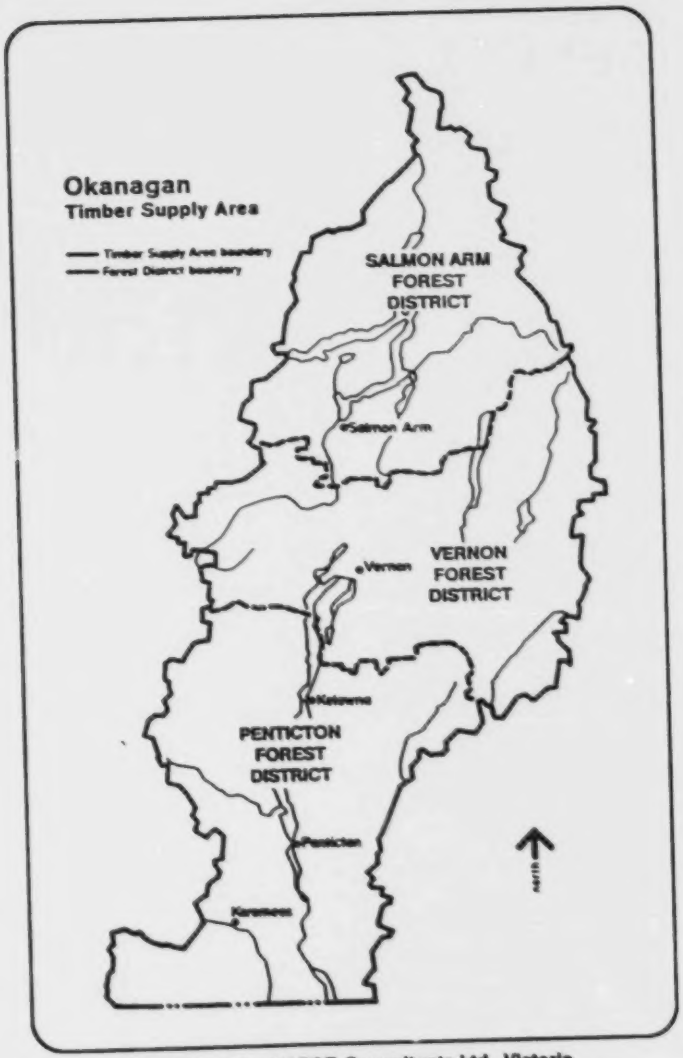
Okanagan
Timber Supply Area

Integrated Resource Management



OPTIONS REPORT

Approved By:

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October 1, 1990

Facilitated by SOFOR Consultants Ltd., Victoria

Okanagan
Timber Supply Area

91-00491/

Timber Supply Area boundary
Forest District boundary

KEY MAP

SALMON ARM FOREST DISTRICT

Sicamous

Salmon Arm

VERNON FOREST DISTRICT

Vernon

Kelowna

PENTICTON FOREST DISTRICT

Penticton

Keremeos

NORTH

PROLOGUE

The Options Report for the Okanagan Timber Supply Area is an intermediate step in the preparation of the Resource Management Plan for this area. The review of this report constitutes one of the opportunities for public input into the planning process. This report and the input received will provide basic information for the development of a draft Resource Management Plan for additional public comment.

The Options Report contains a number of potential management choices based on all the natural resources in the Okanagan/Shuswap area and lists the anticipated impacts of each. This is not a complete listing of all possibilities, but demonstrates some of the choices available.

Although the options and scenarios presented in this report deal with timber, recreation and fish and wildlife habitat relatively independently, the "option" which will form the basis of the Resource Management Plan will integrate forest resource uses.

Responses will be reviewed by the Regional Manager who will provide advice to the Chief Forester concerning forest management objectives in this TSA. The Chief Forester requires an option which successfully deals with identified forest resource management issues. The option(s) selected by the Chief Forester will form the basis for a draft Resource Management Plan. The draft Resource Management Plan will be subject to public review and comment before a final plan is recommended by the Regional Manager to the Chief Forester.

The Resource Management Plan developed through this process and approved by the Chief Forester will provide strategic direction to Ministry of Forests resource management activities in the Okanagan TSA for the next five years.

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SUMMARY

The Okanagan Timber Supply Area is one of the most complex areas in British Columbia. Forests range from dry bunchgrass and ponderosa pine types in the south to the wet cedar and hemlock types in the north. Populations vary from high density in the Okanagan Valley to the sparsely populated valleys in the north Shuswap. Land uses are also complex, from four season recreation and tourism, to agriculture and ranching. The forest industry is an important part of a diverse and expanding economy.

The Ministry of Forests has the legislated responsibility to manage the forests of the TSA for timber production, range and forest recreation on Crown lands. Since forest management greatly affects water resources and watersheds, wildlife and fisheries, and other environmental issues important to the public, they are considered in the Ministry's "Integrated Resource Management" planning process. This involves the Ministry in a continuous process of developing and refining plans at the TSA, district and local level. The Ministry's planning process is evolving to include more of the social values that society places on wilderness, old growth, wildlife habitat, recreation use and aesthetics and how these values are managed now and for the future.

This Options Report looks at the "big picture" for the entire Timber Supply Area and sets options or alternative management scenarios for the Chief Forester to consider. It is his legal responsibility under the ***Forest Act*** to set periodic timber, range and recreation objectives for the 35 Timber Supply Areas in the Province.

An important element in developing these options is a discussion with the public as to how the natural resources in the area should be managed. To do this, two series of Open Houses are being held in the spring and fall of 1990. At the first series of Open Houses the planning process was described and maps showing the resources were presented. Newsletters and questionnaires were distributed that described the issues and the public was requested to fill out a questionnaire and provide any further information or comments to the Ministry. Almost 500 people attended the first set of Open Houses and two thirds of them filled out the questionnaire. This information was used to draft the Options Report which will then be taken to the public in the fall. At this time people will be presented with the findings of the first sessions and have the Options Report to review. A second questionnaire will be used to gather public comments on the Options Report. The Chief Forester will then use the Options Report, information from the questionnaires and other public and Ministry information to set timber, range and recreation management objectives for the TSA.

This Options Report is divided into seven sections. Section 1.0 is an introduction and describes how the Options Report fits into the Ministry's integrated resource management planning process. Section 2.0 describes the natural resources in the Okanagan TSA and the economy based on those resources. Section 3.0 describes how the various government agencies and particularly the Ministry of Forests manages the forest resources in the area. Section 4.0 defines the important issues that affect the management of timber, range and recreation in the TSA. Section 5.0 describes the public participation process and outlines the issues that were defined as important by the people who live in the TSA. In Section 6.0 management levels are described for the three resources directly under the Ministry's mandate; timber, range and recreation. Section 7.0 is the conclusion of the Options Report and describes integrated resource management options for the Chief Forester and the public's consideration.

As described in Section 4.1.2 the mountain pine beetle is a special management problem in the Okanagan Timber Supply Area, particularly in the southern part. The Ministry has granted temporary AAC uplifts of 200,000 m^3 annually since 1987 to manage the beetle infestation and to salvage damaged timber where possible. Ideal weather conditions last winter and this summer contributed to highly successful beetle flights which means the beetle will continue to spread at epidemic levels. Failure to salvage these beetle infested stands would result in further volume losses and future timber supply reductions. Given this emergency situation, in September 1990 the Chief Forester decided to temporarily increase the AAC by 200,000 m^3 for a three year period effective immediately. This temporary increase is over and above the following integrated resource management options.

In summary the options are:

7.1 Current Resource Management Option

This option assumes that the Ministry will continue to utilize and manage resources at the current level. The timber harvest level will remain at 2.7 million m^3. Range and recreation program funding levels will remain at present levels. The implications are that there will be timber supply, water and environmental management problems in the future.

7.2 Increased Resource Management Option

This option is similar to the Current Option except that there will be increased emphasis on integrated resource management, range, recreation and silviculture programs. Staff and funding will increase so that all areas are reforested and some areas intensively managed. There will be more selection logging and silviculture to partly offset short term wood supply problems. It could be increasingly difficult for the Ministry to satisfy demands for old growth protection, wilderness, wildlife and recreation.

7.3 Increased Emphasis on Non-Timber Values Option
This option is similar to the Increased Resource Management Option except that there will be a reduction in the AAC to allow for even more emphasis on forest values other than timber harvest. Two reduction levels are considered, to 2.5 and to 2.3 million m^3. With both of these, the implications of reducing the AAC in the first year, or gradually over a ten year period, are identified. A reduction in the AAC will reduce the falldown effect in 20 years and will provide more management alternatives to protect and enhance non-timber values.

7.4 Timber Harvest Emphasis Option
This option increases the AAC to 3.1 million m^3 and will provide for creation of 400 direct and 1040 indirect jobs in the TSA and increases in related economic spin-offs. It will become increasingly difficult to provide mature accessible timber to manufacturing facilities after 20 years due to the predicted falldown. Provisions for management of environmental issues such as water, wildlife, visual landscapes, wilderness and old growth protection could become more difficult.

Technical terms used in this document are defined in the Glossary, Appendix 1.

1.0 Introduction

The Ministry of Forests has the legal responsibility to manage the forests of British Columbia for the production of timber, forage for cattle and wildlife and for recreation and wilderness. When the Ministry develops forest management plans for timber harvesting, recreation and forage production it must take into account important values such as water, fisheries, wildlife habitat and soil and considers land use issues such as agriculture, parks, access right of ways for power lines, roads, and mining. It is a very complex planning process. A lot of information is needed and the Ministry recognizes all forest uses in its "Integrated Resource Management" planning process.

The people of the Okanagan/Shuswap are an important part of the planning process and are becoming more concerned with a wide range of issues. Where at one time the public left the management of forests to the Forest Service and the creation of jobs to the forest companies people are questioning more and more the overall use of forest lands for social and environmental as well as economic values. It is the responsibility of the Forest Service to weigh these values and come up with management options that balance the needs of communities for jobs and community stability with environmental protection and aesthetically pleasing management practises.

The Integrated Resource Management planning process started in the Okanagan TSA in the early 1980s. Local Resource Use Plans were at that time and are now an important part of the planning process. A Timber Supply Analysis was done and a Strategic Plan was finalized in April 1984. A statement of Issues, Options and Procedures was completed in November of 1985 and the Allowable Annual Cut (AAC) was set at 2.7 million cubic meters and range objectives were set at 90,882 animal unit months (AUMs). Forest related recreation was growing at a rate of 15% per year and was projected to continue to grow in the foreseeable future. Due to the severe outbreak of Mountain Pine Beetle in the southern part of the TSA the AAC was periodically raised above the 2.7 million m^3 to control the spread of the beetle and salvage damaged timber.

This Okanagan Timber Supply Area "Options Report" is a planning document and part of the Integrated Resource Planning process (See Section 3). The purpose of this document is to describe the natural resources of the TSA and different management issues and options so that the public can provide input that will assist the Chief Forester in meeting his responsibility under the ***Forest Act*** which is to:

1. Set an Allowable Annual Cut which will allow the Ministry of Forests to direct the harvest of timber to support the mills in the TSA;

2. Set an objective for range management that will allow the Ministry to manage forage for wildlife, and domestic livestock requirements and to licence Crown lands for grazing by the ranching industry;

3. Set objectives for the management of forest and range lands for public recreation so that opportunities for all types of recreation experiences, activities and facilities can be maintained.

2.0 Okanagan TSA - Resources and Regional Economy

2.1 Area Description

When examining the possible directions for the management of the timber, range and recreation resources in the area, it is important to understand the nature of the entire regional economy. This section presents a picture of the area's economy and resources, so that options for timber, range and recreation can be considered in this larger context.

The Okanagan Timber Supply Area is one of the largest and most complex TSAs in the Province. Approximately 320 km long and 140 km wide, it stretches from the watershed of the Seymour River that flows into Shuswap Lake, south to the Canadian/American border; from the Monashee Mountains in the east to the Okanagan Range in the west. There is a diversity of climates and associated vegetation, from the wet interior hemlock and cedar forests in the north to the semi-arid sage brush grasslands of the south.

As of the 1986 census, the area supports a population of 223,371. Along with the lower mainland and southern Vancouver Island this is one of the fastest growing areas in the Province. The Okanagan supports some of the largest population centers in the interior of the Province. This places some special demands on the area's resources. For example, there is an ongoing need to maintain high quality water supplies. There is also a growing demand for various types of high quality outdoor recreational experiences, for both area residents and those travelling in the area.

The area has a diversified economy in that it is not reliant on one economic activity. The main industries are tourism, agriculture, forestry, manufacturing and service to a large retired population in the Central Okanagan. Tourism and recreation are especially important and this has a major impact on the management of forest resources. The forest industry supports approximately 10,000 direct and indirect jobs or about 10 percent of the work force in the overall TSA but forestry accounts for approximately 25% of the economic activity in the northern part of the TSA.

The Okanagan TSA contains important wildlife and fisheries resources and supports the greatest diversity of wildlife in the Province. Habitats range from the desert near Osoyoos to glaciers near Revelstoke and each habitat supports its own variety of wildlife.

2.1.1 Climate

The climate of the TSA is affected by the rainshadow created by the Coastal Mountains. As the warm moist maritime air masses move in from the coast, they are forced to rise over the mountains, dropping much of their moisture on the coastal regions. This creates the hot, dry interior type weather of the Okanagan Valley. The northern portion of the TSA, around Shuswap Lake, is in the foothills of the Rocky Mountains, where the air again begins to rise and rainfall is heavier and temperatures are more moderate than in the south.

2.1.2 Biogeoclimatic Zones

The Province has been divided into fourteen broad, climatically distinct areas usually named after the dominant tree species. These biogeoclimatic zones are differentiated by distinct patterns of vegetation and soil. Seven of these zones are found in the TSA.

Bunchgrass

The Okanagan Valley bottom from Summerland to the border and west to Keremeos is in the Bunchgrass zone. This area is naturally grasslands and sage, with occasional ponderosa pine and Douglas-fir, although the dry climate restricts their growth. It supports critical winter and spring forage for bighorn sheep and white-tailed deer and is the home of the burrowing owl. This zone also provides critical spring livestock range and, with irrigation, has produced some of the Province's most valuable agricultural land.

Ponderosa Pine

The Ponderosa Pine zone borders the Bunchgrass zone on the slopes of the Okanagan Valley and extends up the valley to north of Kelowna. This is the warmest and driest of the Province's forest zones. Ponderosa pine is the dominant tree with open grasslands on the drier sites and Douglas-fir on the colder and wetter sites. Like the Bunchgrass zone, this zone provides important range forage and, with irrigation, is valuable agriculturally.

Interior Douglas-fir

At still higher elevations and stretching north to Shuswap Lake is the Interior Douglas-fir zone. Douglas-fir is the dominant tree species, mixed with lodgepole pine at higher elevations and ponderosa pine and open grasslands at lower elevations. Pinegrass, bunchgrasses and shrubs dominate the understory, providing important spring and fall forage for livestock and winter forage for wildlife.

Montane Spruce

Surrounding the sub-alpine mountain tops and on the higher plateau areas is the Montane Spruce zone. Engelmann and hybrid spruce and

varying amounts of subalpine fir are the characteristic tree species, with lodgepole pine, Douglas-fir and trembling aspen also occurring. This zone provides important summer range.

Engelmann Spruce - Subalpine Fir

This zone occurs at the higher elevations in the TSA. Only those plants capable of tolerating extended periods of frozen ground occur, with Engelmann spruce, subalpine fir, and lodgepole pine as the dominant tree species.

Interior Cedar - Hemlock

This zone occurs in the northern portion of the TSA around Shuswap Lake and in the south in the Monashee Park/Sugar Lake area. This area is much wetter, with warmer winters and cooler summers than in the south. This zone is the most productive for growing trees and has the widest variety of species. Western hemlock and western red cedar are characteristic but spruce and subalpine fir are common. Douglas-fir and lodgepole pine are generally found on drier sites. This zone is important for growing trees and for range after logging.

Alpine Tundra

This zone occurs at the highest elevations. These are treeless areas with covers of grass, flowers and shrubs. This zone is important summer range for wildlife, and has high recreation value.

2.2 Population and Communities

The TSA contains all of the Central Okanagan and North Okanagan, and most of the Okanagan-Similkameen Regional Districts. There is also a small part of the Columbia-Shuswap and a slice of the Thompson-Nicola and Grand Forks-Greenwood Regional Districts. The statistics presented in this section are of areas that most closely follow the TSA boundaries.

The following table shows the populations in each Regional District and the percentage of the total TSA population. It does not include the small portions of the Thompson-Nicola and Grand Forks-Greenwood Regional Districts.

Table 1
Population Summary by Regional District (1986 Census)

Regional District	Population		% of TSA
Columbia Shuswap			
Salmon Arm	11,200		
Falkland	3,260		
Sorrento	4,160		
Sicamous	3,750		
Rural	2,066		
	Total	24,436	10.7%
North Okanagan			
Armstrong	2,706		
Enderby	1,849		
Vernon	20,400		
Lumby	1,181		
Rural	28,684		
	Total	54,820	24.1%
Central Okanagan			
Kelowna	61,213		
Peachland	2,988		
Lakeview Heights	6,115		
Westbank	10,237		
Rural	13,299		
	Total	93,852	41.3%
Okanagan-Similkameen			
Penticton	23,600		
Osoyoos	2,956		
Keremeos	839		
Oliver	3,230		
Okanagan Falls	1,470		
Kaleden	1,004		
Rural	21,286		
	Total	54,385	23.9%
Total All Regional Districts		**227,493**	

The highest concentration of people is in the Central Okanagan, centered around urban Kelowna and the outlying communities of Westbank and Lakeview Heights. Population projections done by the Central Statistics Bureau of the Ministry of Finance predict an increase of 80% in the next 20 years, from 90,000 in 1986 to 150,000 in 2011.

The Penticton/Peachland area experienced one of the fastest growing rates in the Province during the 1980s and this growth is expected to continue. The North Okanagan also has a large urban population around Vernon and outlying areas with a projected 2% increase per year, over the next 20 years. Similarly, Salmon Arm is growing at a rate of approximately 2 percent per year and will continue to grow as transportation links improve.

The growth in population in many of these areas is from retirees coming from other parts of the Province or the prairies. This trend will result in an ageing of the population at a rate faster than the Provincial average which increases the demand for health services and recreation facilities.

Table 2
Population Trends, 1981-1986

Oliver	+ 3.3%
Penticton	+ 3.9%
Peachland	+ 7.5%
Kelowna	+ 4.7%
Vernon	+ 1.5%
Spallumcheen	+ 0.4%
Salmon Arm	+ 2.4%
Keremeos	- 1.5%
Osoyoos	+ 4.0%
Okanagan Falls	+ 1.4%

The following identifies the seven Indian Bands located in the TSA. Due to Bill C31 which allowed Indian women to regain their Indian status, the populations of Indian people on reserves increased substantially during the late 1980s. The Indian people of the Okanagan are of the Shuswap and Okanagan Tribes which are part of the Interior Salish group of aboriginal peoples.

Table 3
Native Population on Reserves, 1983

Band	Number of Reserves	Population*
Lower Similkameen	9	224
Osoyoos	2	176
Okanagan	5	871
Penticton	2	391
Westbank	3	226
Spallumcheen	3	337
Little Shuswap Lake	5	193
Total	**29**	**2,418**

*Data from Indian and Northern Affairs Canada

The following table shows the labour force in the TSA in 1986.

Table 4
Labour Force, 1986

Sector	Persons*	%
Agriculture	8,200	8.4%
Fishing and Trapping	95	0.1%
Logging and Forestry	2,720	2.8%
Mining (including milling), quarrying	1,120	1.1%
Manufacturing (including sawmilling, etc)	12,255	12.5%
Construction	5,885	6.0%
Transportation and Storage (includes lumber)	3,120	3.2%
Communication and Utilities	2,800	2.9%
Wholesale Trade	3,460	3.5%
Retail Trade	15,485	15.8%
Finance and Insurance	2,815	2.9%
Real Estate Operators and Insurance Agents	2,060	2.1%
Business Service	3,145	3.2%
Government Service	4,415	4.5%
Educational Service	5,015	5.1%
Health and Social Service	8,550	8.7%
Accommodation, Food and Beverage Service	9,355	9.4%
Other Service Industries (includes to forest ind.)	7,635	7.8%
Total	**98,130**	**100.0%**

*Data from Statistics Canada

2.3 Agriculture

Agriculture is an important part of the economy supporting a workforce of approximately 8,200, 8.4% of the total labour force. Vineyards, orchards and cattle are a traditional part of the region's image. Intensive agriculture takes place in the valleys of the Okanagan, Similkameen, Shuswap and Salmon Rivers. In the South-Central Okanagan 96% of B.C.'s soft fruits and grapes are grown, replaced by hardier tree fruits such as apples further north. Fruit processing companies and wineries are concentrated in this area. The South-Central Okanagan, particularly around Keremeos and Oliver, has important forage production operations.

In the North Okanagan and Shuswap areas, livestock operations, dairy production and forage crops are the prevalent types of agriculture. These operations are discussed in the Range and Ranching section.

2.3.1 Development Potential

The area has very good agricultural land which is ideal for tree fruit production. There is a population base to support increased domestic production in many commodities particularly vegetables.

Constraints

Land Costs

The major constraints to the expansion of agriculture in the area is the high cost of agricultural land, which is under pressure for residential development. As a result, production has become more capital intensive and the cost of land per improved hectare is nearly double the Provincial average.

Water

Availability of water for irrigation is a problem in the Okanagan and Similkameen Valleys. These areas are very dry and improvement of land by irrigation is very costly.

The following table shows the that there are 2,316 farms in the area and gives a breakdown of farm size and income.

Table 5
Farms and Farm Land Base, 1985

Area	Farms Sales > $250 < $10,000	Farms Sales > $10,000	Hectares Improved Land	Capital (millions $)	Sales (millions $)
Oliver	331	596	10,895	258.1	38
Penticton	367	315	4,689	165.3	14.9
Peachland	96	65	1,270	52.3	6.7
Kelowna	401	491	8,757	322.5	32.2
Vernon	400	198	13,254	170.9	16.3
Spallumcheen	365	271	15,310	177.6	31.7
Salmon Arm	356	184	12,177	143.2	22
TOTAL	**2,316**	**2,120**	**66,352**	**1,289.9**	**161.8**

The following table shows the hectares planted in each crop.

Table 6
Area in Various Crops, 1985

	Oliver	Penticton	Peachland	Kelowna	Vernon	Spallumcheen	Salmon Arm
Hay	3,139	903	205	1,701	5,191	7513	5,901
Feed Grains	280	183	0	143	844	950	473
Feed Corn	0	0	0	0	667	1,180	0
Grains	0	0	0	0	0	21,556	0
Orchards	3,270	1,931	370	3,929	509	38	**
Grapes	686	173	*	368	*	*	0
Other Fruits	6	0	125	15	41	10	**
Vegetables	157	0	8	91	94	222	31
Other	533	233	78	623	694	377	1,498
Total	**8,071**	**3,423**	**786**	**6,870**	**8,041**	**12,445**	**7,903**

*Included in fruits
**Statistics not available - included in "Other"

Oliver Area

Agriculture and logging are the most important sectors of the local economy. In addition to peaches, apricots, cherries, plums, apples, pears and other fruit, a large amount of land is devoted to heat dependent vegetable crops including tomatoes, onions and sweet corn. Grape growing has increased rapidly in recent decades and further expansion is possible as the climate is the most favorable in the Province. However,

increasing international competition may lead to a reduction in grape and soft fruit acreage. Hay production and the livestock industry are centered in the valley bottom, and a few irrigated benchlands.

Penticton Area

Although agriculture is no longer the most important sector of the local economy, it remains a basic factor and contributes substantially in terms of both direct and indirect employment. Arable land occurs in large blocks at Summerland and Penticton, in narrow strips bordering Okanagan and Skaha Lakes and along the Okanagan River. Much of the best land has been converted to residential and industrial subdivision. Tree fruits account for most of the cultivated acreage; apples and pears are dominant but soft fruits are grown in volume also. Grapes, berries, vegetables, and nursery and greenhouse crops contribute smaller amounts to farm income. There is a Federal agricultural research station at Summerland and packing and processing facilities in both Summerland and Penticton.

Kelowna Area

The benchlands within and surrounding the City of Kelowna yield a large proportion of the apples and pears grown in the Province, as well as smaller quantities of grapes, cherries, plums, peaches, apricots, vegetables and potatoes. There are a few commercial poultry farms. The head offices of B.C. Tree Fruits Ltd., which handles the marketing of most fresh tree fruits in the Interior, and its processing arm, Sun-Rype Products Ltd., are located in Kelowna, which is also a major centre for fruit storage, packing and processing facilities. Hay production is diminishing, but is still maintained, particularly in the Joe Rich and Winfield areas.

Vernon Area

Virtually every type of farming in the Province is found in Vernon. Dairy products, beef cattle and tree fruits (primarily apples) are the leading sources of farm income. Vegetables, grapes, berries, poultry, other livestock, and greenhouse and nursery crops are other important income sources. A high proportion of arable land is devoted to hay, pasture and grains to support the livestock industry.

Spallumcheen Area

This area marks a transition between climatic zones and this is reflected in the types of agriculture found here. Dry-land farming is general in the southern part of the Spallumcheen because little irrigation water is available at reasonable cost; grain, hay and field peas and beans are the leading crops. Where water is available, fruit and vegetables are grown. In the northern part of the area, rainfall is heavier and dairy farming is

the leading activity. Beef cattle are also an important source of income, with lesser amounts contributed by poultry, pigs, and sheep.

Salmon Arm Area

Tree fruits were once the leading crop but the number of trees has declined significantly since about 1950. Declines are attributable to high tree mortality suffered during severe winters, lack of irrigation water at reasonable cost, and residential subdivision of farm land. Commercial vegetable production followed a similar pattern. Beef and dairy cattle are now the leading sources of farm revenue. Eggs, hay, grain, pigs, potatoes and nursery products also contribute to farm income.

2.4 Tourism

Development of tourism got its real start when the Hope - Princeton Highway was opened in 1949, making the Okanagan a favorite destination for Lower Mainland residents. Improvements to the existing highway network provided further stimulus and completion of the Rogers Pass section of the Trans-Canada Highway in 1962 greatly increased the flow of visitors from the prairies. Further expansion is anticipated with the completion of Phase 3 of the Coquihalla Highway.

In addition to established commercial operations such as hotels, motels and campgrounds, new enterprises such as house boat vacations, ski hill expansions and heli-skiing are diversifying and expanding tourism into a year round industry. While the Okanagan/Shuswap area is known for its large lakes and sandy beaches, recent trends indicate a growing desire for more diversified recreation opportunities. Hiking, fishing, wildlife viewing and wilderness experience are becoming more important. This suggests a trend towards greater demand for public and commercial back country recreation opportunities and services.

Most of the TSA, with its numerous lakes and warm, dry climate is a popular tourist destination as well as an important stop-over point for travellers. Apart from the scenery and climate, the area offers excellent boating and beautiful public beaches on Shuswap, Skaha and Okanagan Lakes, as well as numerous smaller lakes. There is good fishing for rainbow trout, eastern brook trout, dolly varden and kokanee, plus opportunities for hunting and wildlife viewing. Wildlife viewing has been recognized as a significant new dimension to the tourism industry and is actively being marketed.

Development of many ski hills in the Okanagan during the latter part of the 1960s has been a benefit in reducing the extreme seasonality (high summer and low winter use) of the tourist industry. It is also reduced to some extent by the significant number of prairie residents wintering in

the area. The Okanagan/Shuswap has a growing national reputation as a desirable retirement area. In addition, many professionals and others with discretionary leisure time and income are drawn by the quality of life and outdoor recreation amenities. This is raising expectations and demands for year round private and public facilities. This promises to strengthen the small business support and service economy.

Other attractions include the fish hatchery and agricultural research station at Summerland and the Okanagan game farm. Historic O'Keefe Ranch near Vernon is another popular attraction. The industry has actively promoted off-season attractions to reduce seasonality with the result that Penticton and Kelowna have become two of the leading convention centers in the Province.

The area has a number of excellent parks listed on the following table.

Table 7
Parks in the TSA

Name	Access	Camping (Y/N)
Antlers Beach	Paved Road	N
Apex Mountain Recreation Area	Gravel	N
Bear Creek	Paved	Y
Cathedral	Gravel	Y
Christie Memorial	Paved	N
Cinnemousun Narrows	None	Y
Darke Lake	Gravel	Y
Echo Lake	Gravel	N
Ellison Lake	Paved	Y
Eneas Lake	4WD, Trucks	N
Haynes Point	Paved	Y
Herald	Paved	Y
Inkaneep	Paved	Y
Kalamalka Lake	Paved	N
Keremeos Columns	None	N
Kickininee	Paved	N
Mabel Lake	Gravel	Y
Mara	Paved	N
Monashee		
Nickel Plate	4WD, Trucks	N
Okanagan Falls	Paved	Y
Okanagan Lake	Paved	Y
Okanagan Mountain	None	Y
Pennask Lake Rec. Area	4WD, Trucks	N
Shuswap Lake	Paved	Y
Shuswap Lake Marine Parks (11)	None	Y

Parks in the TSA (cont.)

Silver Beach	Gravel	Y
Silver Star	Gravel	N
Sun-oka Beach	Paved	N
Sunnybrae Rec. Area	Paved	N
T. Dagnus Locheed	Paved	N
Vaseux Lake	Paved	Y
Yard Creek	Paved	Y

A wide variety of recreation opportunities are available to residents and visitors in the Okanagan TSA because of the area's unique climate and topography. Activities representative of the urban, rural and roaded resource land categories of the Recreation Opportunity Spectrum (ROS) are abundant. However, wilderness (lands providing for semi-primitive and primitive recreation use) is limited in this TSA to relatively few locations, primarily in the south-west and in the north-east boundary areas. Of the remaining wilderness, four areas representing .6% of the TSA have been protected for future use.

The following table summarizes the remaining unroaded areas and projected to remain unroaded areas by the 8 ecosections that occur in the TSA. There are very few remaining unroaded areas in 4 ecosections: the Okanagan Basin and Highland, and the East and South Thompson Uplands. For these ecosections, virtually all the remaining unroaded lands outside of designated protected areas contribute to the AAC and are therefore scheduled to be roaded. Approximately 1% of these 4 ecosections have designated protected areas, which is considerably below the Provincial average of 6.3%.

For the Okanagan TSA as a whole, 14% is unroaded, and 4% is projected to remain unroaded if areas that contribute to the AAC are developed. Less than 1% (0.6%) of the TSA is formally designated as a park/wilderness. The current, projected and designated wilderness resource in the Okanagan TSA is considerably below the Provincial average.

Table 8
Wilderness in the TSA by Ecosection

Ecosection	Percent Ecosection in TSA[1]	Percent Unroaded[2]	% Projected to Remain Unroaded[3]	Park/ Wilderness[4]
Okanagan Basin	100	1	0	2
Okanagan Highland	90	4	0	2
E. Thompson Upland	60	2	0	0
S. Thompson Upland	25	5	1	0
Okanagan Range	60	24	5	18
Shuswap Highlands	60	14	2	8
N. Columbia Mountains	25	56	30	16
S. Columbia Mountains	10	16	8	1
Total, TSA	-	14	4	0.6
Total, B.C.	-	56	24	6.3

Notes:

[1] Estimate only.

[2] As of March, 1988; includes primitive and semi-primitive non-motorized and motorized ROS classes.

[3] Unroaded areas that do not contribute to AAC and therefore are projected to remain unroaded.

[4] Formally designated National and Provincial Parks, recreation areas, and wilderness areas.

2.5 Range and Livestock

In the southern portion of the TSA beef cattle are ranged on land not suited to cultivation including grasslands and range land under forest cover. Dairy farming was more important in the past but most properties have been converted to more intensive agriculture or housing.

In the northern part of the TSA, rainfall is heavier and dairy farming is more important than ranching, although beef cattle are an important source of income, with lesser amounts contributed by poultry, pigs and sheep.

Range carrying capacity (which indicates the number of animals that an area can support) and licences are assessed in Animal Unit Months (AUM). One cow, with or without calf, one bull or one yearling (one AUM), requires an average of 330 kilograms of forage per month. The

number of hectares required to support one cow for the average 5 month grazing season varies from 3.5 to over 35 hectares of useable forage, depending on forage quality and production.

Each type of forest or non-forest area has a different carrying capacity for cattle according to whether it is undisturbed, selection logged etc. The following table shows estimated areas of the various types of forest and non-forest cover in the TSA and a range of forage production.

Table 9
Areas Suitable for Range

	Total Area in TSA (ha)	Forage Production (kg/ha)
Grasslands	25,000	100-300
Wetlands (swamps)	11,000	300-600
Alpine	180,000	100-150
Ponderosa Pine Forest	30,000	30-150
Dry Forests	440,000	100-150
Lodgepole Pine Forest	270,000	50-80
Wet Forests	580,000	50-150
Deciduous Forest	33,000	50-100
Clearcuts/wildfires	200,000	50-1,000

The following table shows the same forest cover types and their accessibility, species of forage and season of use.

Table 10
Accessibility and Season of Use

	Accessibility (%)	Major Forage Species	Season
Grasslands	20-100	Blue Bunch Wheatgrass	Sp, F
Wetlands (swamps)	0-100	Sedges	Su, F
Alpine	0-100	Mix of Flowers, Grasses	Su
Ponderosa Pine Forest	30-70	Blue Bunch Wheatgrass	Sp, F
Dry Forests	10-80	Pine Grass	Su
Lodgepole Pine Forest	10-60	Pine Grass	Su
Wet Forests	0-20	Mix of Flowers, Grasses	Su
Deciduous Forest	0-100	Blue Grass	Sp, Su, F
Clearcuts	0-100	Pine/Orchard Grass, Clovers	Sp, Su, F

2.6 Timber Resources

2.6.1 The Forest Land Base

The following table shows a breakdown of the 2,206,892 hectares of the TSA. The total productive forest land (1,403,647 ha) is arrived at by deducting all areas such as rock, alpine, swamps etc. that cannot support forests. The net forest land base that is managed for timber production (988,194 ha) is determined by subtracting from the total productive forest land all areas that are forests but cannot be managed for timber harvest. This includes NSR (Not Sufficiently Restocked ie. logged, burned or subject to other natural destruction, but not reforested), ESA (Environmentally Sensitive Areas such as stream banks, critical wildlife or fisheries habitat or other areas that can only be partially managed for timber) and other forest types that cannot be managed for timber.

Table 11
Forest Land Base

Classification	Area (Ha)
Total TSA Area	2,206,892
Total Productive Forest	1,403,647
Reductions:	
NSR	37,279
NC	9,754
Roads and R/W	32,118
ESA	137,759
Low Site	25,705
Deciduous	27,409
Unmerchantable	163,159
Timber Licence reclass	1,438
Additions:	
Timber Licence Reversions	19,168
NET FOREST LAND BASE	**988,194**

Note:

NSR	Not Sufficiently Restocked
NC	Non Commercial
ESA	Environmentally Sensitive Areas
R/W	Rights of Way

The description of areas and volumes and the tables do not include the figures for the portions of TFLs 15, 33 and 49 that are within the three Forest Districts. The TFL areas are discussed in the issues section but are not technically part of this planning process. The following table shows the three Tree Farm Licence areas.

Table 12
TFLs in Okanagan TSA

TFL #	Licensee	AAC	Area (ha)
#15	Weyerhaeuser Corp.	71,000	48,583.0
#33	Federated Cooperative Ltd.	27,500	8,458.4
#49 a,b,c	Fletcher Challenge Canada	361,074	144,922.6
	Total	**459,574**	**201,964**

The following table shows the volumes of mature and immature timber on the total forest land. Timber in the TSA varies from cedar and hemlock in the wet belt areas of the north to lodgepole and ponderosa pine in the south. Volumes are approximately 25% pine, 21.5 % Douglas-fir, and lesser amounts of spruce, balsam, hemlock and cedar.

Table 13
Total Volumes of All Species in the TSA

Species	Mature Volume (m^3)	Immature Volume (m^3)	Total Volume (m^3)	%
Fir	30,454,800	34,616,200	65,071,000	21.5%
Cedar	19,602,310	6,093,770	25,696,080	8.5%
Hemlock	23,407,180	3,878,850	27,286,030	9.0%
Balsam	31,426,060	4,162,630	35,588,690	11.8%
Spruce	43,906,390	5,528,710	49,435,100	16.3%
Pines	60,613,880	15,452,290	76,066,170	25.1%
Larch	6,009,690	6,306,500	12,316,190	4.1%
Deciduous	5,095,000	5,899,724	10,994,724	3.6%
Total Volume	**220,515,310**	**81,938,674**	**302,453,984**	**100%**

Crown land with unalienated timber has 1,303,320.9 hectares of mature and immature forest which is 87.5% of the total area the TSA. Crown land with alienated timber comprises 1%. Private and municipal lands with mature and immature timber cover 7.5% and Indian Reserves 1.8%. Other ownerships, including Crown land designated for uses other than forestry, is 4% of the remainder, none of which are greater than 1%. The following table shows the land classification of forests.

Table 14
Forested Area of each Ownership

Ownership	Mature Timber (ha)	Immature Timber (ha)	Total Forested (ha)	%
Crown	775,752.7	527,568.2	1,303,320.9	87.5%
Crown - Timber Alienated	9,812.5	5,003.0	14,815.5	1.0%
Private & Municipal	32,794.5	80,031.6	112,826.1	7.5%
Federal Reserves	25.7	12.3	38.0	0.0%
Indian Reserves	13,477.4	13,125.5	26,602.9	1.8%
Ecological Reserves	1,656.1	716.8	2,372.9	0.2%
Recreation (U.R.E.P)	1,733.7	1,415.4	3,149.1	0.2%
Park Class A	1,738.6	2,084.9	3,823.5	0.3%
Park Class C	0.0	29.5	29.5	0.0%
Park Reserve	0.0	6,337.1	6,337.1	0.4%
Provincial Reserve	8,289.5	6,646.1	14,935.6	1.0%
Other	872.6	996.5	1,869.1	0.1%
Total Areas	**846,153.3**	**643,966.9**	**1,490,120.2**	**100.0%**

Crown land with unalienated timber has a volume of 270,958,100 cubic metres. Sixty six percent of this volume is mature timber and 24% immature. Of the total timber volume in the TSA, 89.6% is on Crown land. The following table shows the timber volumes on Crown land in the TSA with the percentage of each species.

Table 15
Volumes of Timber on Crown Land

Species	Mature Volume (m^3)	Immature Volume (m^3)	Total Volume (m^3)	%	% of TSA*
Fir	27,183,150	26,966,310	54,149,460	20.0	83.2%
Cedar	16,885,490	5,177,040	22,062,530	8.1	85.9%
Hemlock	20,444,900	3,324,430	23,769,330	8.8	87.1%
Balsam	30,050,770	3,762,790	33,813,560	12.5	95.0%
Spruce	42,323,880	4,994,410	47,318,290	17.5	95.7%
Pines	60,042,790	12,604,990	72,647,780	26.8	95.5%
Larch	5,558,000	5,388,650	10,946,650	4.0	88.9%
Deciduous	2,433,530	3,816,970	6,250,500	2.3	56.8%
Total Volume	204,922,510	66,035,590	270,958,100	100.0	89.6%

*This column shows the percentage of each species that is on Crown land, as compared to the total volume in the TSA. For instance, 83.2% of the fir in the TSA is on Crown land.

2.6.2 Forest Industry

Studies done by Forestry Canada[1] indicate that every 1,000 m^3 of wood cut in British Columbia produces 1 direct job and 2.6 indirect jobs. Therefore, the TSA, with an AAC of 2.7 million cubic metres produces 9,720 jobs in the logging, manufacturing and service industries related to forestry. The forest industry represents 9.9% of the total workforce of 98,130 people. In addition, for every m^3 of wood cut, $140 is contributed to the economy (Gross Domestic Product) and $19 is added to government revenue in the form of stumpage, taxes etc.

Penticton Area

Weyco operates a mill at Okanagan Falls and there are smaller mills at Canwood and Greenwood. There are private tree nurseries at Summerland and Osoyoos.

Kelowna Area

Fletcher Challenge Canada Ltd. operates a large integrated sawmill and veneer-plywood plant at Kelowna. In 1986 the sawmill had a shift capacity of 240 mfbm and the plywood plant an annual capacity of 86 mm sq.ft. In addition, M & L Wood Preservers operated a post plant at Kelowna in 1986 and L. Russo Sawmills has a mill rated at 20 mfbm per shift. Gorman Bros. Lumber Ltd. operates a mill at Westbank.

Vernon Area

Weyerhaeuser Canada Ltd., Gorman Bros., Bell Pole Ind. and R.V. Schmidt have mills at Lumby, Riverside Forest Products Ltd. has a sawmill and veneer plant, and Tolko Industries Ltd. has a mill at Lavington. There is also a private tree nursery, seed orchard and research station.

Spallumcheen Area

The Fletcher Challenge Canada Ltd. sawmill and veneer-plywood plant at Armstrong has an 8-hour shift capacity of 195 mfbm; the annual capacity of the plywood plant is 170 mm sq ft. There is a post and rail operation in Monte Lake. Considerable additional forest-related employment is provided in tree nurseries. Weyco and Fletcher Challenge operate private tree nurseries.

[1]Impact of Forestry Activity on the Economy of Canada and Its Provinces: an Input - Output Approach. Forestry Canada, 1988.

Salmon Arm Area

The forest industry is the most important employment sector in the Salmon Arm area. The largest manufacturing plant is the Federated Co-operatives Ltd. plywood and sawmill complex at Canoe with a sawmill shift capacity of 215 mfbm and 86 mm sq ft per year plywood capacity. The Westar Timber Ltd. mill in Malakwa is a cedar specialty mill with a shift capacity of 95 mfbm. Two smaller sawmills (Lakeside Timber Ltd at Tappen and Paragon Wood Products Ltd. of Grindrod) have a total shift capacity in excess of 100 mfbm and two shake/shingle mills have a combined capacity of 415 squares per shift. Okanagan Lumber Services at Ashton Creek, North Enderby Timber and Cook Creek Sawmills at Enderby are small mills contributing significantly to local employment. Additional forest industries employment is provided by a pole operation at Sicamous and the Skimikin Nursery in Salmon Arm. There are approximately fifty small sawmills operating in the area and the cedar salvage industry supplies raw material for shake and shingle mills.

2.7 Fish and Wildlife

2.7.1 Wildlife Habitat

Wildlife habitat can generally be identified by the following biogeoclimatic zoning system (See section 2.1). A biogeoclimatic zone has a specific climate and type of forest or grassland. A description of each zone is outlined in Section 2.1.

Bunchgrass

Although one of the smallest biogeoclimatic zones in the Province, this zone supports a wide diversity and density of wildlife. A large number of wildlife species in this zone are of Provincial or National significance because of their rarity or uniqueness. Many are restricted to the southern half of the Okanagan Valley, such as great basin pocket mouse, pallid bat, spotted bat, canyon wren, white-throated swift, burrowing owl, great basin spadefoot toad and tiger salamander. The extensive grasslands provide grazing habitat for Rocky Mountain elk, California bighorn sheep and a host of smaller mammals, birds and reptiles. Wildlife dependent on this habitat may be adversely affected by over-grazing by domestic livestock and by the introduction of noxious weeds.

Moist shady draws produce a completely different wildlife habitat from the adjacent dry treeless steppes. These are very productive sites, supporting species from the adjacent Ponderosa Pine zone.

Riparian areas (those adjacent to waterbodies) support a rich fauna of breeding birds. Lakes and streams in this zone either remain open year-

round or are the first to thaw in the spring. As such they provide important staging areas for migrating waterfowl in the spring.

Common Wildlife	Special Concern
Rocky Mountain Elk	Burrowing Owl
Mule Deer	Short-horned Lizard
Coyote	Prairie Falcon
Yellow-bellied Marmot	White-throated Swift
Vesper Sparrow	Night Snake
Bank Swallow	Canyon Wren
Western Bluebird	Nuttal's Cottontail
	Sage Thrasher
	Grasshopper Sparrow
	California Bighorn Sheep
	Pallid Bat
	Spotted Bat
	Tiger Salamander
	Anatum Peregrine Falcon
	Sage Grouse*
	Sharp-tailed Grouse*
	White-tailed Jackrabbit*

*no longer found in this area

Ponderosa Pine

The short, largely snow free, winters of this zone attract many animals during the winter months. Mule deer, white tailed deer, bighorn sheep and Rocky Mountain elk may migrate long distances to winter in this zone. Flocks of mixed species of birds that come down from higher elevations are also found in this zone during the winter months.

Open stands of ponderosa pine provide habitat for many types of birds and the open forest canopy allows in light for the production of shrubs palatable to wintering ungulates. Denser stands of Douglas-fir and ponderosa pine provide thermal cover for wintering ungulates and an abundant seed and insect source for a variety of birds and small animals.

Common Wildlife	Special Concern
Mule Deer	Lewis' Woodpecker
White-tailed Deer	Rattle Snake
Rocky Mountain Elk	Townsends' Bigeared Bat
Red-breasted Nuthatch	Pallid Bat
Gopher Snake	California Bighorn Sheep
Northwestern Chipmunk	Turkey Vulture
Badger	White-headed Woodpecker
	Western Small-footed Myotis

Interior Douglas-fir

Most of the wildlife in this zone share habitat in the Ponderosa Pine zone.

Common Wildlife
Mule Deer
Black Bear
Squirrel
Moose
Hoary Bat
Northern Pocket Gopher
Bobcat

Special Concern
California Bighorn Sheep
Cascade Golden-mantled Ground

Flammulated Owl

Montane Spruce

This zone is characterized by colder winters with deeper snow cover and short warm summers. Wildlife that inhabit this zone are adapted to either survive or avoid the deep snows of winter. With the exception of Moose, most ungulates migrate to the Interior Douglas-fir and Ponderosa Pine zones in winter.

The extensive stands of lodgepole pine provide summer and fall range for moose and mule deer with good thermal and hiding cover in the dense regeneration thickets. Birds that forage on bark inhabiting insects such as the three-toed woodpecker and black-backed woodpecker are found in these habitats.

Steep south-facing grassland slopes, though not extensive, are important foraging areas for California bighorn sheep, Rocky Mountain bighorn sheep, mule deer, golden-mantled ground squirrel, golden eagle and mountain bluebird.

Riparian areas and waterbodies are very important habitats for a variety of mammals, birds and amphibians because of the generally dry nature of much of this zone in the summer months. Moose and mule deer select these habitats in the summer to rear their calves and fawns because of the abundant forage and dense security cover.

Common Wildlife
Moose
Mule Deer
White-tailed Deer
Porcupine
Snowshoe Hare
Lynx

Special Concern
Grizzly Bear
Caribou

Engelmann Spruce - Subalpine Fir

This zone has a similar climate as the Montane Spruce zone but with deeper snow cover and wetter summers. Ungulates such as moose, mountain goat, and mule deer are found in this zone. Moose may occasionally winter in some of the drier regions of this zone but normally leave during winter to escape the deep snowfall. This zone is one of the most productive zones for grizzly bears.

Conifer forests comprise the most common habitat and are important for marten, fisher, red squirrel, Wolverine, as well as a variety of seed eating birds such as the red crossbill, white-winged crossbill, pine sisken and Clark's nutcracker.

Young forests resulting from logging and wildfire provide habitat for a wide variety of wildlife. Many species of ungulates select these habitats during summer.

Common Wildlife	Special Concern
Moose	Caribou
Marten	Grizzly Bear
Lynx	
Red-breasted Nuthatch	
Pine Sisken	
Spruce Grouse	
Clark's Nutcracker	
Mountain Goat	
Hoary Marmot	

Interior Cedar - Hemlock

The climate of this zone is characterized by cool, long snowy winters and warm dry summers. Many of the species of the Montane Spruce and Engelmann Spruce zones share this zone.

Common Wildlife	Special Concern
Mule Deer	Grizzly Bear
White-tailed Deer	
Mountain Goat	
Black Bear	
Stellar's Jay	
Moose	

Alpine Tundra

The alpine tundra, essentially a treeless region characterized by a harsh climate, is found on the high mountains in the TSA. The long, cold winters and short cool growing seasons create conditions too severe for the growth of most woody plants - except in dwarf form. Hence this zone is dominated by dwarf shrubs, herbs, mosses and lichens. This zone has high recreational appeal and provides for important range for caribou, mountain goats and mountain sheep. Due to the severe climate, it is a very sensitive habitat.

Common Wildlife	**Special Concern**
Mountain Goat	California Bighorn Sheep
Mule Deer	
Water Pipit	
Wolverine	
Hoary Marmot	

2.7.2 Areas Set Aside for Wildlife Habitat Preservation

Wildlife Reserves

Wildlife Reserves are areas reserved for the protection of wildlife and fisheries habitat or to facilitate recreational use. These areas are usually Crown land or held under lease from private owners. Hunting and fishing may be permitted in these areas.

Antlers Saddle* - South of Peachland - deer winter range
Ashnola River* - east of Cathedral Park - California bighorn sheep
Garnet Valley* - north of Summerland - deer winter range
Osoyoos Oxbows* - Inkaneep Cr. - Wildlife Reserve for birds, and reptiles such as burrowing owl, white-headed woodpecker, turkey vulture, California quail, bats, lizards, bull snake, rattlesnakes.
Robin Way Marsh - south of Kelowna - waterfowl.
Salmon Arm Foreshore - Bird and waterfowl nesting area.
Skaha Lake East* - California bighorn sheep winter range
Shorts Creek* - southwest of Vernon, west shore Okanagan Lake - California bighorn sheep
Swan Lake - north of Vernon - waterfowl
Trepanier Creek* - north of Peachland - mule deer winter range
Vaseux Lake area - 3 reserves – California bighorn sheep, waterfowl, raptors, trumpeter swans, unique desert habitat

*These areas are private land not covered by leases, or are only partly covered.

Wildlife Viewing Areas

As noted in Section 2.4, wildlife viewing and natural history interpretation is regarded as having significant value to the tourism industry as well as enriching outdoor opportunities for residents of the region. It is anticipated that interest in natural history recreation will increase and this will be reflected in future forest land management decisions.

The following are acknowledged as areas good for public viewing of wildlife. They may or may not have viewing facilities, interpretive aids, or developed access.

Cathedral Park - Deer, mountain goat, California bighorn sheep, golden eagle, hawks

Pennask Lake - Spawning rainbow trout in June - partial interpretive facilities

Osoyoos Oxbows - Burrowing owl, white-headed woodpecker, turkey vulture, California quail, bats, lizards, bull snake, rattlesnakes

Salmon Arm - Bird and waterfowl nesting area. Of particular interest are the breeding displays of Clarke's and western grebes which nest between April and June

Vaseux Lake - Wildlife Reserve for California bighorn sheep, waterfowl and other migratory birds

Federal Migratory Bird Sanctuaries

Areas where hunting of migratory birds is prohibited, except by permit.

Vaseux Lake - trumpeter swans

National Wildlife Areas

Vaseux-Bighorn - unique desert habitat

2.7.3 Fish

Most lakes and streams are well stocked with rainbow and lake trout, kokanee and dolly varden. The most important streams within the TSA are Eagle, Shuswap, Okanagan, Kettle, Similkameen, Wap, Ashnola, Mission, Powers, Peachland, Trepanier, Lambly, Mill, Coldstream, Bessette, Duteau, Kingfisher, Scotch, Seymour, Ratchford, Salmon and Noisy Creeks. These streams are either important as a fishery or important as fish production areas. Category A lakes are of special interest for fish production and recreation.

2.8 Water and Watersheds

The southern Okanagan is one of the driest areas in Canada with semi-desert conditions in some areas. Management of the bunchgrass and dry Douglas-fir and ponderosa pine forests for water, timber production, range and wildlife is complicated by the fact that some of the best soils for agriculture and best living areas for people are in the dry valley bottoms.

A 1984 government policy stated: "All Crown land in Community Watersheds will be planned and managed on an integrated resource management basis with priority given to the protection of water supplies".

The following table shows the watershed source, user and drainage area of Community Watersheds in the Okanagan TSA.

Table 16

Community Watersheds

Source	User	Drainage Area (sq. mi.)
Bass Creek	Seymour Arm	1.5
Brash Creek	Enderby	10.7
B X Cr.	Vernon	27.2
Duteau Cr.	Lumby	76.3
Duteau Cr.	Vernon	"
East Canoe Cr.	Salmon Arm	10.0
Fortune Cr.	Armstrong	15.9
Fortune Cr.	Highland Park	"
Fortune Cr.	Lansdowne	"
Fortune Cr.	Otter Lake	"
Fortune Cr.	Pleasant Valley	"
Fortune Cr.	Round Prairie	"
Fortune Cr.	Silver Star	"
Glanzier Cr.	Stepney	3.0
Gordon Cr.	Salmon Arm	5.9
Hobson Cr.	"	1.3
Hudson Cr.	Anglemont Utilities Ltd.	1.8
Huntley Cr.	Larkin	1.5
Hydraulic Cr.	S.E. Kelowna	35.0
Irish Cr.	Grandview	3.7
Kalamalka L.	"	223.0
Kalamalka L.	Coldstream	"
Kelowna Cr.	Ellison	28.2
Kelowna Cr.	Glenmore	"
KLO Cr.	"	35.0
Lambly Cr.	Lakeview	88.6

Community Watersheds (cont.)

Source	User	Drainage Area (sq. mi.)
Mission Cr.	Black Mountain	238.2
Mission Cr.	Rutland	318.0
Oyama Cr.	Wood Lake	21.3
Peachland Cr.	"	45.5
Penticton and Ellis Cr.	Penticton	123.9
Powers Cr.	Westbank	55.5
Robinson & Naramata Cr.	Naramata	27.8
Rumball Creek	Salmon Arm	
Sicamous Creek	Sicamous	
Trepanier Cr.	Peachland	90.0
Trout and Eneas Cr.	Summerland	304.9
Vernon Cr.	Winfield and Ok. Centre	32.7
Whelan Cr.	Ellison	3.2
White Cliff Gulch	Salmon Arm	1.0

There are also numerous unregistered smaller watersheds used as private water sources.

2.9 Mining

Local mineral resources, particularly in the vicinity of the old mining town of Hedley, have been intensively studied in recent years. Nickel Plate mine on the border of the TSA near Hedley, where Corona Corp. operates a combined open-pit and underground gold mine. Production commenced in the second quarter of 1987; milling capacity is 2,700 tons per day and current reserves are sufficient to permit operations until late 1997. In 1989 1,065,026 tonnes were milled and total average employment was 181 people. While the mine is outside the TSA boundary most of the employees reside in the Penticton area.

In the Fairview Camp, near Oliver, Valhalla Gold Group Corp. proposes re-opening an old mine. If it proceeds, the project would operate at 270 tonnes per day for up to 10 years with a workforce of about 40.

The Mascot gold mine is in the Penticton area. Small gold and silver producers operated near Okanagan Falls in the 1970s. This location is currently undergoing considerable exploration activity.

Quinto Mining Corp. proposes reactivating the old Chaput Silver property north of Lumby. Work on a pilot operation commenced late in 1987. If the mine is developed it is expected to employ about 58 workers. Production would be 250 tons per day, giving a possible mine life of seven years. Exploration activity in the area has recently led to a

number of precious metals discoveries that may have some development potential. More than 1.25 million tons of gypsum for building products were quarried at Falkland between 1925 and 1956. No other mining activity of note has been conducted in the area. Exploration has revealed the presence of a number of highly interesting silver-lead-zinc deposits in a narrow belt just north-east of Shuswap Lake that may have potential for development in the future.

Table 17
Metal Mines and Employment, 1989

	Milled (tonnes)	Total Average Employment
Brenda Mines*	11,562,626	413
Nickel Plate**	1,065,026	181

*Mine closed in 1990.
**Mine not in TSA but most employees live in Penticton.

2.10 Non-Forest Products Manufacturing

Oliver Area

The largest manufacturing concern is General Coach Division of Citair Inc. with a motor home factory in Oliver. Other manufacturing includes bakeries, concrete products, machine shops, ready mix concrete, printing and publishing, woodworking, furniture, agricultural products, and agricultural equipment.

Penticton Area

Manufacturing activity in the area includes a wide range of products. The largest employer (excluding sawmills) is Moduline Industries Ltd., a manufacturer of mobile or prefabricated housing. Other large employers include Okanagan Mfrs. Ltd. (RV's), Okanagan Spa Co. (hot tubs), Peerless Page Industries Ltd. (industrial trailers), Penticton Foundry Ltd., Greenwood Forest Products Ltd. (panes and components), and Canwood Furniture Factory Ltd. (furniture components). Additional manufacturing ranges from building products and agricultural equipment to bakeries, wines, metal fabrication, fruit processing, and printing.

Peachland Area

Manufacturing in the Peachland area includes wine, brandy, cider, baked goods and building products.

Kelowna Area

Leading employers are Hiram Walker & Sons Ltd. (distillery), Western Star Trucks Inc. (heavy duty trucks), Sun-Rype Products Ltd. (juices and processed fruit), Okanagan Houseboats Ltd., Kelowna Daily Courier (printing), Calona Wines Ltd. and Maloney Steel Ltd. (fabricating). Other manufacturing includes bakeries, soft drinks, plastics, millwork, upholstery, cabinets, ready-mix concrete, precast concrete, machine shops and truck parts.

Vernon Area

The leading manufacturer in the Vernon area is Consumers Glass Company Ltd., with a glass container plant at Lavington. Other manufacturing includes Dairyland, Kal Tire Ltd. (retreading), Far West Industries Inc. (sports clothing), Alcan Pipe Div. of Aluminum Co. of Canada Ltd. Non-forestry manufacturing is not as diverse as Kelowna but includes soft drinks, bakeries, leathers, building components, upholstery, cabinets, boats, machine shops, ready-mix, concrete products, printing and publishing, meat products, fiberglass products, and others.

Spallumcheen Area

Large employers include Bigfoot Industries (RV's), Colonial Farms Ltd. (poultry processing) and Rogers Foods Ltd. (flour mill). Non-forestry manufacturing in 1987 included slaughterhouses, bakeries, printing and publishing, feed mills, a culvert plant, and two plants producing bathroom products.

Salmon Arm Area

The largest non-forestry products manufacturer is Newnes Machine and Ironworks Ltd., producers of sawmilling equipment. Others include slaughterhouses, a dairy, bakeries, ready mix concrete, concrete products, printing and publishing, upholstering, boatbuilding, prefabricated buildings, windows, monument stones, machine shops, and a manufacturer of blasting products.

3.0 Integrated Resource Management Process

Forest Resource Planning is a very complex process involving many government agencies, companies and the public. The following sections describe the government and other agencies involved in resource management.

3.1 Ministry of Forests

The Ministry of Forests is the arm of the Provincial government that administers the ***Ministry of Forests Act***, the ***Forest Act*** and the ***Range Act***.

3.1.1 Ministry of Forests Administration

The Ministry of Forests has three administrative levels; headquarters in Victoria and six regions; Prince Rupert, Vancouver, Prince George, Cariboo, Nelson and Kamloops. The regions contain 43 districts of which the Salmon Arm, Vernon, Penticton, Lillooet, Kamloops, Clearwater and Merritt districts are in the Kamloops Region. For planning purposes the Province is divided into 35 "Timber Supply Areas" and the Districts of Salmon Arm, Vernon and Penticton are in the Okanagan Timber Supply Area (See the Key Map).

The following is a description of the Ministry of Forests:

Headquarters

The deputy minister and ministry staff based in Victoria advise the minister and Provincial Cabinet on all matters relating to forest and range policy-making. The headquarters group also supports and guides the work of the regions and districts throughout the Province. The headquarters group is divided into three divisions headed by an assistant deputy minister. These three officials, together with the deputy minister as chairman, constitute the Ministry's executive. There are fifteen branches reporting to members of the executive.

Kamloops Region

The regional office is organized by functions, similar to the way that the ministry headquarters is organized.

Regional managers and their staff develop regional programs and procedures from broad Provincial policies. Then they pass the programs and procedures on to the districts, and supply professional and technical expertise to help implement the programs. The regional offices audit and monitor the performance of districts, and take responsibility for all regional field operations.

Districts

There are three districts in the Okanagan TSA:

Penticton Forest District
Vernon Forest District
Salmon Arm Forest District

The district manager and staff are responsible for the field work involved in administering forest and range regulations and licence agreements, and protecting forest and range lands against fire and disease.

As a front-line operation, the district office is the best place to go for help or information about Ministry programs and local forestry or range matters. For instance, the staff can describe harvesting and development plans, forest recreation sites and trails in the district and about cattle grazing on Crown land. They can offer advise about using logging roads, cutting firewood, and preventing forest fires, etc.

District offices also issue licences and permits for activities such as salvage logging and harvesting Christmas trees. They receive applications for registration under the Small Business Forest Enterprise Program and for various other licences and permits. Contact district staff if you have any questions about the forest, range and recreation practices in your area.

3.1.2 The Ministry of Forests Act, the Forest Act and the Range Act

The ***Ministry of Forests Act*** Section 4(c) states the purpose and the function of the Ministry in regards to integrated resource management is to:

> "plan the use of the forest and range resources of the Crown, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consulation and cooperation iwth other ministries and agencies of the Crown and with the private sector"

The Ministry administers the ***Forest Act*** and the ***Range Act***. The ***Forest Act*** states that the Chief Forester will assess the land in the Province for its potential for:

1. Growing trees continuously;
2. Providing forest or wilderness oriented recreation;
3. Producing forage for livestock and wildlife;
4. Conservation of wilderness, and

5. Accommodating other forest uses.

The ***Forest Act*** further states that the Chief Forester will classify areas as forest land if it will provide the greatest contribution to the social and economic welfare of the Province if it is predominantly maintained in successive crops of trees or forage, or as wilderness.

Section 5.1 regarding wilderness states that the government may designate a wilderness area. Once designated the area may not be logged but may be used for:

1. The preservation of wilderness;
2. Any use consistent with the preservation of wilderness;
3. Other permitted uses.

Section 7 states that the Chief Forester will determine an Allowable Annual Cut in each Timber Supply Area of the Province. Section 104 states that the Chief Forester can designate Crown land for forest recreation and trails. The ***Range Act*** says that the Ministry of Forests can issue grazing and hay cutting licences and permits on Crown lands.

To manage for timber, recreation and range the Ministry of Forests has divided the Province into 35 "Timber Supply Areas". The Okanagan Timber Supply Area takes in all the watersheds that drain into Shuswap, Okanagan and Skaha Lakes plus additional areas. This is an area from the north end of Shuswap Lake to the Canadian/American border. A description of the TSA is found in Section 2 of this report.

Through legislation, the Ministry of Forests has the responsibility for managing the forests of British Columbia for the production of timber, for recreation and for the production of forage for cattle and wildlife. Because many other natural resources are affected and are a part of forests, the Ministry takes these into account when it plans for timber harvesting, recreation and forage production. Other important values are water, fisheries, wildlife habitat and soil. Other land uses are agriculture, access right of ways for power lines, roads, mining access, and many others. It is a very complex planning process. A lot of information is needed and the Ministry attempts to recognize all forest uses in its "Integrated Resource Management" planning process.

This Okanagan Timber Supply Area "Options Report" is a planning document and part of the Ministry's Integrated Resource Planning process. This document assists the Chief Forester to perform his responsibility defined in the ***Forest Act*** for the Okanagan TSA which is to:

1. Set an Allowable Annual Cut for the harvest of timber in the Okanagan TSA;

2. Set an objective for range management that will allow the Ministry to licence Crown lands for the production of forage for cattle for the ranching industry;

3. Set objectives for the management of forests for public and commercial recreation.

3.1.3 Planning

Timber Supply Areas (TSAs)
Timber Supply Areas are geographic units established by the Ministry of Forests under the authority of Section 6 of the ***Forest Act*** for the planning and management of the forest resources within its boundaries. The boundaries take into account transportation networks and the location of manufacturing facilities. The TSA includes areas of public forest land that are managed by both the Forest Service and by Forest Licence holders. The TSA Options Report sets timber, range and recreation management objectives for the public lands outside the Tree Farm Licences. Management objectives for the TFLs are set separately within the TFL planning process.

Integrated Resource Management (IRM)
"Integrated Resource Management" (IRM) is a process of natural resource management where all resource values, environmental concerns and resource users are considered.

Integrated Resource Management involves the public in the planning process. The following shows how the public was involved in the preparation of this Options report:

Step 1 June 1990
Meetings were held around the Okanagan/Sushwap area to provide information to the public and identify issues that are important to the people living in the area.

Step 2 July
Information was assembled and issues described in a draft Options Report that outlines how the Ministry proposes to manage the forests of the area for timber, range and recreation given all the public's concerns.

August

Step 3

An analysis was done to show how different management "Options" affect each other and what the costs and benefits are. Alternatives were considered and the Ministry asked "What if" timber harvest was accelerated or decreased. What effect would that have on water, wildlife, jobs, community stability etc? "What if" more area was put aside for wilderness, parks, wildlife etc?

November

Step 4

The "Options Report" developed in 3 will be presented to the public for discussion with a broad range of alternatives for people to consider. Public response to the Options Report will be gathered through newsletters, questionnaires and public meetings.

December

Step 5

The "Options Report" and public response will be presented to the Chief Forester so that he can select a level of harvest for timber and set recreation and range objectives. In selecting management alternatives he will use the Options Report, other technical information from the Ministry of Forests and other government agencies, and input from the public. The Regional Manager in Kamloops will collect all public comments that he receives from letters, questionnaires and briefs and make his recommendations to the Chief Forester.

December 1990 - June 1991

Step 6

Once the Chief Forester has set timber, range and recreation objectives the Ministry, with input from the public, will develop a "Management Plan" for the area. This will in more detail define where and how the timber, range and recreation resources will be developed while considering the Issues (wildlife, water, wilderness, etc.) developed with the public in Step 1 and the management alternatives discussed in the Options Report. This management planning process will involve a series of public meetings to discuss ways of managing the resources in the TSA.

On-going

Step 7

The planning process is on-going as society evolves and different issues become more important to the public. Under the old planning system the Chief Forester sets management objectives for the Forest Service every five years. The public is demanding more say in the management of natural resources so the Ministry is becoming more involved in seeking the public's views on a wide variety of natural resource issues.

3.2 Other Government Agencies

The Ministry of Forests is not the only government agency involved in managing natural resources in the Okanagan. The following Federal, Provincial and local governments are involved:

3.2.1 Provincial

Environment

The three main branches of the Ministry of the Environment involved in natural resource management are the Wildlife, Fisheries and the Water Management Branches. The Wildlife and Fisheries Branches work with the MoF to identify critical wildlife habitat and suggest ways to manage forests that minimize the negative impact on fish and wildlife. Additionally, the Pesticide Control Branch authorizes the use of chemicals for pesticide and herbicide control and the Conservation Branch administers the Ministry's acts and legislation. The Water Licensing Section issues water licences for a variety of uses which impacts on watershed management and works with the MoF on related issues. The Ministry of Environment has regional offices in Kamloops and Penticton.

Parks

The Ministry of Parks is responsible under the ***Park Act*** for the designation, management and conservation of a land- and water-based system of parks, recreation areas and ecological reserves containing the best representative elements of the Province's natural and cultural heritage. It manages all of the resources within park boundaries to both protect the natural environment and provide recreation opportunities. There are three classifications for parks:

Class A Parks (Provincial Parks)

The majority of parks are Class A, in which commercial resource harvesting is not permitted.

Recreation Areas

These areas are park reserves under evaluation for mineral resources and may become Class A parks on completion of the evaluation. While these lands are under strict control, some commercial logging may be allowed. In 1988/89, 22 recreation areas where upgraded to park status.

Class C Parks
These are community parks and make up a small percentage of the parks system. They are gradually being turned over to municipal and regional governments for administration in keeping with the Ministry's goal to have all major lands within the system designated as Class A Parks.

There are 379 parks and recreation areas in B.C. covering 5.4 million hectares or 5.3 percent of the Province.

In addition to parks, the Ministry manages the Ecological Reserve system. These areas are set aside to preserve samples of representative, rare or endangered ecosystems. They offer long-term research and educational opportunities as well as casual, non-consumptive public uses, such as nature photography and bird watching.

Agriculture and Fisheries
The Ministry is responsible for industries involved in producing, processing, distributing and marketing agricultural, fish and food products in the Province.

Transportation and Highways
The Ministry is responsible for the transportation systems in the Province, of which highways is the largest. Apart from the reduction of the forest land base caused by road building, and changes in recreation patterns due to new roads or road upgrading, the major effect of highways on the Ministry of Forests' responsibilities is in Visual Resource Management. Highway engineers try to minimize the negative impact of roads on the landscape, while the Ministry of Forests usually is responsible for the adjacent visual corridor.

The Ministry of Highways is a member of the Environmental Land Use Committee and deals directly with the Ministry of Forests on issues of land clearing, right of way maintenance, access and gravel pit rehabilitation. Most coordination is done at the regional level.

Energy, Mines and Petroleum Resources
This Ministry is responsible for managing the Province's energy and mineral resources so as to obtain the best value for the people of B.C. It is the Ministry's responsibility to:

- Put in place policies that promote the effective management of energy and mineral resources, consistent with and responsive to the government's overall economic goals;
- Collect a fair share of resource revenue for the Province; and
- Ensure that the operations involved are safe, efficient and environmentally sound.

There are two divisions within the Ministry that are directly involved in resource planning, the Energy Resources Division and the Mineral Resources Division. These two divisions oversee the operations of the Province's industries in the mining and energy fields.

The Ministry works with the Ministry of Forests by ensuring reclamation of land disturbed by mining including appropriate revegetation or reforestation processes such as reseeding, resloping and fertilizing. The Ministry often stipulates conditions to protect forest resources as part of the Provincial approval of energy products. Conversely, the Ministry participates in several Ministry of Forests initiated procedures including pulpwood agreements and wilderness designated proposals.

3.2.2 Federal

Fisheries and Oceans

The Department of Fisheries and Oceans (DFO) is responsible for the protection and management of fish and fish habitat under the ***Fisheries Act*** of Canada. In B.C., DFO is primarily concerned with the management of salmon and marine species. DFO Fishery Officers and Habitat Management staff review forest harvesting plans, provide advise to MoF and industry and monitor logging operations to ensure that water quality and fish habitat are preserved.

Environment Canada

This federal department is divided into three sections; Parks Canada, Conservation and Protection and the Atmospheric Environment Service. Parks Canada oversees the federal parks system. Conservation and Protection is divided into three branches; Environmental Protection, Inland Waters Directorate, and the Canadian Wildlife Service.

Environmental Protection is responsible for enforcing the ***Canadian Environmental Protection Act*** and for the section of the ***Fisheries Act*** dealing with industrial pollution. The agency, in cooperation with other agencies, protects the environment by identifying environmental problems, and then developing and carrying out protection and control measures.

The Inland Waters Directorate, in cooperation with Provincial agencies, is responsible for water quality monitoring, groundwater resources, and water planning and management. The Okanagan Basin Implementation Program has improved flood control, water quality and provided a plan for water management in the Okanagan Valley.

The role of the Canadian Wildlife Service is to protect and manage Canada's migratory birds, to provide leadership in wildlife management, and to cooperate with other agencies and organizations in maintaining the productivity of wildlife habitat.

3.2.3 Regional Districts

The following six regional districts are within the Okanagan TSA.

Columbia-Shuswap
North Okanagan
Central Okanagan
Okanagan-Similkameen
Kootenay Boundary (Small area)
Thompson-Nicola (Small area)

Regional Districts have the power of planning for land uses of areas outside municipalities and Provincial Forests as defined in the ***Municipal Act***.

3.2.4 Municipalities

Municipalities have the power to plan land uses and levy taxes within defined population boundaries. The largest municipalities in the TSA are Kelowna, Penticton, Vernon and Salmon Arm. Although they have no direct power over the management of natural resources, municipal growth affects water, recreation and impacts on forest, range and wildlife. The people within the municipalities are the major users of the natural resources within the TSA and most people who work in the natural resources industries live in the municipalities.

3.3 Public Interest Groups

There has been an increased awareness of environmental issues such as the greenhouse effect, ozone depletion, aesthetic pollution and pollution in general. This has created an increased demand for changes in how our natural resources are managed. Local Resource Use planning committees have been formed that have representatives from many public interest groups.

4.0 Issues Affecting Timber, Range and Recreation

Although the Ministry of Forest's mandate as defined in the ***Ministry of Forest Act*** is to manage the forests for timber, range and recreation, the Ministry also considers a broad range of environmental, social and land use issues in managing the timber resources of the TSA. An issue is defined as a social or economic activity that has some positive or negative impact on the forests and environment of the Okanagan/Shuswap.

The following issues were identified by the Ministry and the public at Open Houses held from June 18 to 27, 1990, at the following centers; Kelowna, Penticton, Keremeos, Vernon and Salmon Arm. At the Open Houses maps, information, newsletters and questionnaires were presented for the public's consideration (See Appendix 2 and 3). The issues will be considered in developing the options for the Chief Forester when he sets an AAC for timber and range and recreation objectives for the next five years.

4.1 Timber

The present AAC of 2,700,000 cubic meters was based on forecasts of timber supply and levels of silviculture as assessed in the 1980 yield analysis. The AAC was increased by 200,000 m^3 in 1987, 500,000 m^3 in 1988 and 120,000 m^3 in 1989 to allow for the removal of timber infested by mountain pine beetle. The AAC is apportioned as follows:

Table 18
AAC Apportionment

TENURE	AAC (m^3)	Percent (%)
Forest Licences	2,258,399	83.6
Timber Sale Licences	14,012	.5
Small Business Enterprise	376,009	13.9
Woodlot Licences	27,000	1.1
Forest Service Reserve	24,580	.9
Temporary Uplift of AAC*	200,000	
Approved AAC	**2,700,000**	**100.0**

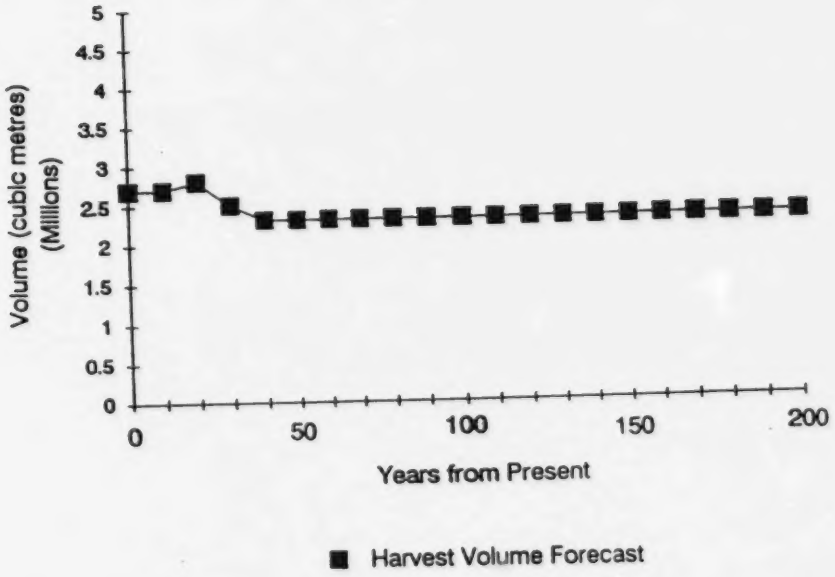
*Temporary Uplift of AAC for mountain pine beetle control, not shown as percentage of apportionments.

The 1988 Timber Supply Analysis Report portrayed a decrease in the timber supply in the Okanagan TSA since the previous 1980 analysis. The 2,700,000 m^3 cut level could be maintained for 20 years and would then have to be reduced to 2,287,000 m^3 per year over the long term.

This long run sustained yield (see below) assumed a constant productive forest land base of 988,000 hectares.

The Ministry has calculated a long run sustainable yield (LSRY) for the TSA. The LRSY is the volume of timber that can be harvested on a sustainable basis given the productive forest land base, the type of forest management practised and the timber "profile" which takes into account different quantities of mature and immature timber. The following graph shows the harvest forecast for the next 200 years assuming present assumptions remain unchanged.

Figure 1
Harvest Forecast



Since the 1988 analysis, a number of issues have been identified that will affect the supply of timber that can be realistically harvested over the next 100 years. Some of these issues may cause a reduction in the forest land base available for timber production.

4.1.1 Accessibility and Operability

There are significant volumes of timber in the TSA that are inappropriate to harvest at this time because of a number of factors including steep slopes, unstable terrain making road building difficult

or impossible, timber which is too far from an operating mill or not of good enough quality to warrant the expense of harvest.

This is a problem throughout the TSA but critical in marginally economic parts of the northern Salmon Arm area and the eastern portion of the Vernon area where there are large volumes of marginal timber. For example, some of the decadent hemlock and cedar in the wet belt on steep slopes present harvesting problems. These stands, though difficult from a timber harvesting point of view, may have high value from a fish and wildlife, and wilderness perspective. A complete biophysical inventory of these forests is needed.

It is generally assumed that some areas will have to be removed from the productive forest land base and that this will reduce the Allowable Annual Cut in the long term. This will have a greater impact in the northern part of the TSA.

Impact
Some stands throughout many parts of the TSA, but particularly in the northern and central eastern parts, may not be harvestable in the foreseeable future. Traditional harvest planning has not demonstrated utilization of these sites. If they are to remain in the net land base then development plans must incorporate these sites and specialized equipment or techniques may be required to take advantage of them. If not, then these sites should be removed from the timber supply.

4.1.2 Volume Losses

Mountain Pine Beetle

The infestation of mountain pine beetle has been widespread through parts of the Interior of the Province. As the beetle favours drier, lodgepole pine forests it is more predominant in the southern part of the TSA. It is estimated that 17,000 hectares are infested in Penticton District, 2,000 ha in Vernon and less than 50 ha in Salmon Arm. The AAC has been temporarily raised over the last three years to deal with the mountain pine beetle outbreak.

Beetle populations are controlled by harvesting and debarking the infested trees which kills the beetles. The Ministry program for beetle control will involve baiting appropriate stands with pheremones (sex attractants) and salvaging timber that was attacked by the beetle. The program will also include the harvesting of single attacked trees and blocks of green attacked wood (timber that is currently being attacked by the adult beetle) further infestations will be reduced by 'beetle proofing' - harvesting the stands most susceptible to infestation. All salvaging and harvesting operations are followed by reforestation, as required.

The mountain pine beetle has created a number of significant management problems in some areas. Where stands are not harvested the cost of clearing the dead trees and replanting is much more than under normal reforestation conditions. Major infestations have resulted in an accelerated cut in some watersheds creating environmental concerns. Where timber is not soon harvested bluestain, checking and spiral grain lowers the quality and value of lumber produced.

Although harvesting patterns are being altered to deal with the beetle killed timber in the short term, there are long term implications of raising the AAC to overcome this problem. The main impact will be to increase the "falldown effect" in the southern Districts. (See Section 4.1.5)

One of the major long term implications is that where a watershed has been overcut, the Ministry of Environment provides recommendations through the referral process concerning silviculture activities such as brushing and weeding, site rehabilitation or juvenile spacing to minimize the impact on wildlife cover and travel corridors. The same concept applies to the future removal of leave blocks which were left after the first pass of mountain pine beetle harvest.

Other Pest Losses

Past and current forest management practises have not addressed other forest pests that have had a detrimental effect on the current level of forest health. The incidence of root diseases has increased over the last twenty years in all forest types. Also, periodic outbreaks of defoliator insects are causing unsalvageable volume losses.

Impact

The mountain pine beetle has reached epidemic proportions in the southern part of the TSA. Harvesting beetle infested stands is a necessary management tool to control the spread. Failure to salvage the beetle infected sites will result in a loss of existing volumes and a reduction in the long run timber supply. Raising the AAC specifically for MPB or losses due to other pests may impact on future timber supply and other resource values. Other pests also contribute to volume and timber quality losses and affect how the Ministry implements silviculture systems.

4.1.3 Reductions to the Forest Land Base

The term "forest land base" means an area where a primary objective is to manage for recreation, wildlife, water, range and timber production. The forest land base is constantly being reduced for a wide range of

economic and environmental uses. Roads, hydro rights of way, subdivisions and farms etc. cause removal of lands from timber production and other forest uses. The Coquihalla Highway, for example, caused a reduction of the forest land base.

Designations of forest land for parks or roads reduces the land base which supports resource development activities. The smaller the forest land base, the lower the volumes of timber that can be produced, less forage for cattle and, in some cases, fewer recreation opportunities.

If the population grows by the anticipated 2 percent per year in the Okanagan area, recreation demands will increase as well. The forest land base could be reduced with a corresponding decrease in timber production and a major reduction in jobs in the forestry sector throughout the Okanagan area. An increase in silviculture can partially offset the loss by growing more trees faster but society will have to weigh the value of timber in relation to other environmental, economic and social values.

Effects on Timber Harvest

The forest land base and therefore the projected timber supply for the future may be affected by the following:

1. Projected increases in population will result in greater demand for water and therefore increased protection of watersheds.

2. The public demand for wilderness and forest conservation is expanding. This may result in protected areas with no logging or cattle range use or areas where timber harvest may be reduced.

3. The public is more concerned about the visual effects of logging. Although visually acceptable landscapes can be retained (ie. through selection and landscape logging), visual corridors may be partially or completely protected resulting in lower timber yields from these areas.

4. More areas may be protected or managed differently for wildlife, fish and bird habitat.

5. The public is demanding more recreation as the population grows and access from the coast improves. In addition, tourism is a growing industry in the Okanagan/Sushwap area. Forest and logging roads provide access which changes the management patterns for timber production.

6. A number of other issues such as more concern for biodiversity and general environmental protection could have the effect of reducing the forest land base.

The following specific uses have been identified as affecting forest management and may result in reducing the forest land base as trees will either not grow on these areas or the areas will be partially or wholly protected:

- Coquihalla Right of Way
- Agriculture leases
- Ecological reserves
- Ski hill visual corridors and expansions
- Monashee Park expansions
- Wildlife Management Areas in Penticton and Vernon areas
- Mine developments
- Greystokes Recreation Area
- Expansion of Highway 97
- Critical watersheds particularly in the southern, drier parts of the TSA
- Wilderness areas
- Old growth reserves

Impact
If present trends continue there may be major reductions in the forest land base of the TSA in the long term, thereby reducing the ability of the remaining land base to maintain the present levels of timber harvest and forage harvest. Other uses will also create management problems for water, recreation and wildlife.

4.1.4 Merchantability (Timber Quality)

Some of the mature forests of the Columbia wetbelt, particularly hemlock-cedar and high elevation balsam and spruce have a high incidence of trees with rotten cores. This low quality timber is often "non-merchantable" as the cost of logging is greater than its value delivered to a mill or the value is marginal.

Although much of this timber has been removed from the inventory the forest industry does not tend to log the marginal timber stands as long as better timber is available elsewhere. Also, mills have been built to utilize higher value timber. To efficiently manage the forests for long term timber production, the poorer quality timber must be harvested with the good timber. If decadent stands are not going to be harvested they should be removed from the AAC.

Impact
The harvest will have to utilize the poorer along with the better quality timber or the AAC will have to be reduced accordingly.

4.1.5 Wood Supply and Distribution

The 1988 Timber Supply Analysis Report indicated a total wood supply of 226,086,000 cubic meters of mature timber on a net land base of 1,126,000 hectares. A problem with the inventory figures is that the actual forest inventory data collection was done in the 1960s and 1970s followed by field surveys in the 1980s. The figures have been continuously updated but not with field surveys. It is generally recognized throughout the Province that new forest inventories based on all forest values must be done. The following figures are based on the best information available at the time of the report.

The following table shows the distribution of land and timber within the three Forest Service Districts of the TSA.

Table 19
Timber Supply and Forest Land Base

District	Land Base (ha)	% of TSA	Volume* (cubic metres)	% of TSA
Penticton	344,000	30.6	60,211,000	26.6
Salmon Arm	369,000	32.8	81,404,000	36.0
Vernon	413,000	36.6	84,471,000	37.4
TSA TOTAL	**1,126,000**	**100.0**	**226,086,000**	**100.0**

This is the total timber supply. Not all is available for harvest because of management for other resource values.

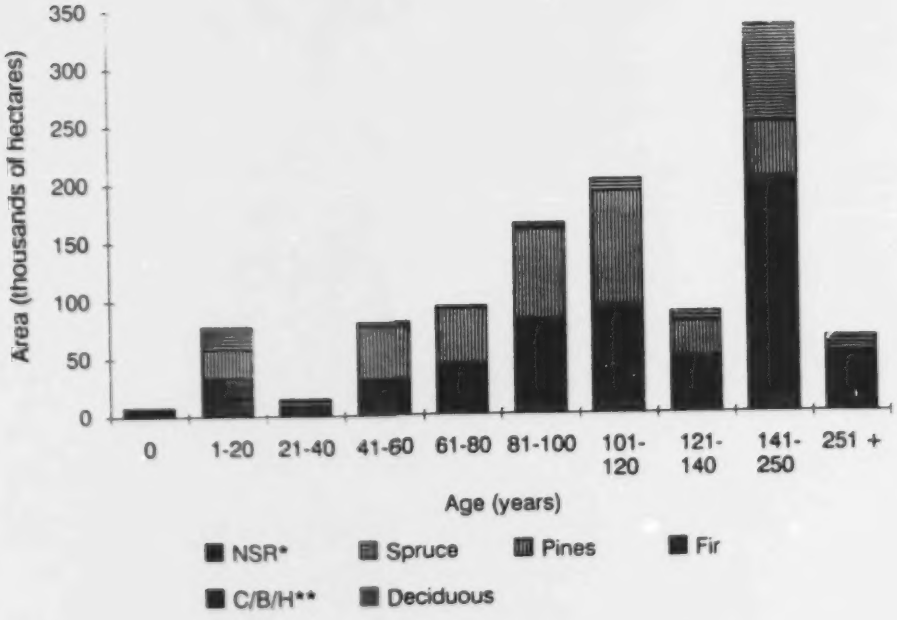
Table 20
Fall Down Effect by District

District	Long Run Sustainable Yield*	Present Harvest Level	Falldown to
Penticton	645,000	958,000	583,000
Percent of LRSY		148.7%	61.0%
Salmon Arm	792,000	1,094,400	791,600
Percent of LRSY		138.2%	72.3%
Vernon	850,000	1,011,000	850,100
Percent of LRSY		119.0%	84.1%
Total	2,287,000	3,063,400	2,224,700

*Based on the 1988 timber supply analysis (historical performance)

The following graph shows how the timber is distributed by age.

Figure 2
Age Class of Areas of Species Groups



* NSR - Not Satisfactorily Restocked (also includes non-commercial brush)
** C/B/H - Cedar, Balsam, Hemlock

The previous graph illustrates a major problem of timber supply in the TSA. There are fewer areas of forest in the 20 to 30 year age classes while the largest areas are in the mature age classes. Therefore, in 50 to 60 years, when the forest industry comes to rely on the forests that are now 20 to 30 years old, there will be less volume available for timber harvest. This is what is known in forest management as the "falldown effect". There is less volume in second growth forests. This will also contribute to the falldown effect.

The Falldown Effect

The falldown effect is a forest management situation that may occur throughout the Province in the future. It is basically caused by two things. First, there may not be as high a volume of timber in second growth forests as in the old growth because original forests had a longer time to grow than managed forests. In the southern parts of the TSA with predominantly lodgepole pine stands the falldown effect may not be as pronounced because it is possible to manage lodgepole pine for high volume. Secondly, the second growth forests will not have evenly distributed age classes. For example, when there is a lot of 40 year old forest and less mature forest there will be a falldown, even though in the long term there will be more timber available.

Both of these situations exist in the Okanagan TSA and there may be a falldown starting in 20 - 30 years as there will be relatively less mature and more immature timber available at that time. The harvest may have to be reduced, based on a constant forest land base of approximately 1 million hectares (See Graph 1 in Section 4.1). Many factors can influence the change from old growth to second growth forest management. Some forests considered unharvestable may become productive because of changing logging practises and second growth forests may produce considerable volume from thinnings and other silviculture practises such as selection logging.

Long Run Sustained Yield

The long run sustained yield (LRSY) is the calculated volume that can be harvested every year from the forest land base given all planning assumptions. The LRSY is an estimate and is constantly being refined as social, economic and environmental situations change.

The following discussion indicates the situation that existed in the spring of 1990. The companies are constantly altering their operating areas to respond to the economic climate at the time. Therefore, the following should not be considered as absolute but as indicative of the future timber supply situation. The following table shows the calculated long run sustainable volumes available to the eight operating areas within the TSA and it shows where there may be a falldown.

Table 21
Timber Supply by Operating Area

Company	Area (ha)	AAC* (m^3)	LRSY** (m^3)
Bell Pole	22,000	43,234	47,000
Fletcher C.	235,000	550,858	482,000
Federated C.	138,000	329,042	288,400
Gorman	132,000	241,242	252,000
Riverside	184,000	291,488	379,000
Tolko	133,000	244,244	269,000
Westar	61,000	162,009	133,000
Weyerhaeuser	221,000	396,282	438,000
Total	1,126,000	2,258,399	2,288,400

*AAC - Present Allowable Annual Cut apportioned to each company

**LRSY - long run sustained yield

Impact
The greatest falldown in supply may be in the Westar operating area where the falldown may be to 67% of what is cut today. The operating areas Fletcher Challenge, Federated, and Riverside may have a falldown to 70% to 80% of today's cut. The operating areas of Tolko, Bell Pole, Gorman Bros. and Weyerhaeuser may have a falldown to 90% of today's. The operating areas can be adjusted to ensure the falldown is shared equally among the licencees.

If this falldown occurs it will have a major impact on the mills, jobs and communities in the operating areas. If some of the mature timber is left today to compensate for the 20 to 30 year old age classes and to minimize the falldown effect then the AAC today will have to be reduced. More silviculture work can be done in the 20 to 30 year old forests to minimize the falldown of timber supply.

4.1.6 Logging Methods

The majority of logging in the Okanagan TSA is presently done by clearcut, with some selection logging in the more open-grown drier forests of the southern Okanagan. The reasons for this are:

1. In some forest types clearcut type disturbance (ie. wildfire) is part of the natural succession, eg. pure even aged lodgepole pine.

2. The clearcut harvesting system is the only safe way to log on some steep slopes.

3. It is often the most cost efficient method of logging,

4. People have been trained and equipment designed and purchased for the clearcut method.

5. If the area is susceptible to windthrow it is the most desirable harvest method.

6. Some species naturally grow into even aged forests or perform best under even aged management.

7. It encourages the utilization of all trees on a site as opposed to high grading only the best trees.

There is a growing interest in the Province as a whole and particularly in the Okanagan for more selection logging for a variety of reasons. In some areas, particularly the drybelt fir and yellow pine areas, selection logging is a very viable method and is used now. In other areas, use of the selection logging system will likely increase in the future, particularly where there are sensitive "other" resource values.

Impact
There may be more selection logging in the future. This may result in a benefit in some areas to water, wildlife and biodiversity preservation.

4.1.7 Biophysical Forest Inventories

The forest inventories in the Okanagan TSA were done in the 1960s and 1970s. Although relatively accurate at that time a number of factors indicate that a new complete inventory should be done. In the 60s and 70s the concern in much of the Province was for jobs and economic development and the inventories were mainly oriented towards timber production. Since then inventories have been continually updated and modified to include environmental concerns. Times have changed, populations have greatly expanded and society's demands from the forests of the Okanagan TSA have broadened. People now are much more concerned about the environment in general.

A new inventory of the Okanagan TSA is needed. A "biophysical" inventory of the forest resources could include all aspects of timber volumes, forage and range capability, recreation potential, terrain and soil characteristics, water and watershed characteristics, wildlife and fisheries habitat and aesthetic values. From that information a series of forest land use maps should be prepared that take into account the

social, economic and environmental aspirations of the people of the Okanagan/Shuswap and the Province.

Impact
New comprehensive forest inventories are necessary for more effective integrated forest management in the future. This should be a high priority.

4.1.8 Okanagan Timber Supply Area Integrated Resource Management Guidelines for Timber Harvesting

These guidelines were implemented in the spring of 1989 and provide an overall framework for integrated resource management decisions with respect to timber harvesting in the Okanagan TSA. Although the focus is on timber management, the guidelines recognize the significance of other resource values and their integration into the process of timber harvesting. These guidelines do not completely address old growth dependent wildlife, caribou or grizzly bear habitat.

The guidelines are currently being reviewed with a view to modification if appropriate.

Impact
The total impact of the guidelines on the timber supply is unknown at this time but the effect may be to reduce the ability of the forest land base to support the present levels of timber harvest and range use.

4.2 Silviculture

4.2.1 Basic Silviculture

Basic silviculture is the reforestation of disturbed areas (logged, burned or subject to other naturally caused destruction) to maintain timber production by adequately restocking with a preferred or acceptable healthy tree species. Since 1987, the ***Forest Act*** states that companies must carry out basic silviculture. This means that logged areas must now be either planted or naturally regenerated with healthy trees in a specific period of time. Brush control is a special problem in the Okanagan TSA and is required in many plantations until young trees are taller than the competing vegetation and are "free growing". Basic silviculture must occur to sustain an appropriate level of harvest and return forest land to a forested state.

Prior to 1987 a lot of areas were not restocked because of limitations on the availability of trees for reforestation. The Ministry is now supplying funds to reforest these areas. Specific concerns related to basic

silviculture in the Okanagan TSA are regeneration of high elevation spruce/balsam sites, the impact of cattle on plantations, and the high incidence of root rot, especially in the northern part of the TSA.

Impact
By law the companies and the Forest Service must maintain a basic level of silviculture. Therefore all productive logged areas will be reforested in the future and there will be future crops of healthy trees from lands logged today. There are still areas in the TSA that were logged prior to 1987 that have not been satisfactorily restocked.

4.2.2 Incremental Silviculture

Incremental silviculture either reduces the time it takes a tree to reach a merchantable size or improves the quality of the future timber crop. Spacing trees reduces competition and increases growth rate. Fertilization improves soil fertility and improves the growth rate. Pruning improves the quality of logs produced in the next crop. Thinning improves growth in older stands and may produce a crop sooner. Incremental silviculture is one way that the quality and/or quantity of future timber crops can be increased on a fixed land base.

Analysis of the timber profile in the Okanagan shows that there is proportionately less forested area in the 20 to 30 year old age classes. In other words in 40 to 50 years there will be fewer areas ready for harvest. Incremental silviculture can increase the volumes in these forests and possibly reduce the "fall down" effect.

Impact
High levels of incremental silviculture can substantially increase the useable volume and grade value of future tree crops. Production can be increased by intensively managing the forests. The volume increases from incremental silviculture will offset some of the losses in timber production from reductions to the forest land base from other demands and can reduce the falldown effect (see 4.1.5).

4.2.3 Backlog Reforestation Problems

As discussed in Section 4.2.1 many areas were not completely restocked prior to 1987. These areas may be classed as not satisfactorily restocked (NSR) or brushed-in areas. This means natural regeneration did not occur and trees were not planted, or that not enough planted seedlings survived. Also, alder, aspen, birch or non-merchantible deciduous species have become established. Some deciduous trees are beneficial to maintain a diverse forest but large areas can be taken over by non-merchantable species which effectively reduces the productive coniferous forest and therefore the productive forest land base.

Under the recent Forest Resource Development Agreement (FRDA) silviculture program, much of the NSR and brush areas have been reforested. The net effect of backlog reforestation, like basic silviculture, is to maintain the forest land base for future timber production. Backlog reforestation can increase future yields as once they are back in production intensive silviculture methods can be applied that will enhance future forests.

Impact
Backlog reforestation will return idle forest lands to a more productive state and may maintain or increase the forest land base and future timber production although these "idle" lands may be productive for water, fish and wildlife, cattle, and recreation.

4.2.4 Funding for Silviculture

Silviculture is an essential part of forest management. The changes to the *Forest Act* in 1987 basically said that silviculture is a cost of logging as are road building, buying logging equipment and fuel. Planting costs average $700 per hectare and spacing $500 per hectare. A fully stocked and free growing hectare can cost up to $2,000 but the value to society in terms of future wood supply, present jobs created and future jobs secured, benefits to recreation, range, wildlife and water are considerable.

Impact
Present funding levels for silviculture will result in a basic level of silviculture but the Provincial funding priorities do not provide for incremental silviculture on a wide scale basis. Funding for all levels of silviculture has increased over the last five years and, given society's demands for intensive and integrated forest management, levels should increase in the future.

4.2.5 Impact of Cattle and Wildlife Grazing on Silviculture

Most forest land is grazed to some extent by cattle and wildlife. Range management and silvicultural systems must be designed to minimize the impact of grazing animals on young forests.

Impact
Cattle and wildlife may cause damage by browsing new shoots in the spring and by trampling young seedlings.

4.3 Community Expansion and Population Growth

4.3.1 Projected Growth Over the Next 20 years - the Effect on the Forest Land Base

Projecting population growth over the life of a forest (ie. 100 years) is difficult but if recent trends continue the population of the Okanagan could continue to grow at 2% per year. At that rate the population will double approximately every 35 years. This will result in increased demands for water, subdivision lands, park lands and for a broad range of recreational activities. Much of this growth can be accommodated within existing land uses but there will be some impact on the forest land base and therefore a possible reduction in timber supply and other resource values under the Ministry of Forests' management. What is equally or even more important is society's changing demand for environmental protection.

While some sectors of the natural resources economy will benefit from the change, possibly recreation and tourism, others in logging and forest products manufacturing may be dislocated. Increased levels of silviculture could produce twice as many jobs as today and minimize the effect of the loss to the forest land base. Increased demands for water quality and quantity will impact cattle and timber harvest in some watersheds and some areas may have restricted vehicle access for recreation. With an increase in population comes a greater demand for the preservation of naturally appearing landscapes. This may result in the removal of forests from timber and forage production and stimulate the review of forest management methods.

Impact

Increased populations in the Okanagan and changing social values will increase the demand for non-timber values in the TSA. This will result in a reduction to the forest land base over the long term. Some of the effect may be mitigated by increases in incremental silviculture and by more environmentally sensitive forest management practises. Communities and companies will have to adjust to new management systems as the structure of the forest, range and recreation industries change to meet new environmental and social demands.

4.3.2 Roads and Their Effect on Other Resources

Roads have a major impact on the forest and range land base. A major highway like the Coquihalla requires the removal of 10 hectares of forest for each kilometer of highway, assuming a 100 m right of way width. It has been estimated that logging access, skid roads and landings reduce the forest land base by 10 to 20 percent. Logging and forest access roads can also be a benefit by opening up new range and recreation areas. Access roads to parks, campsites, cottage sites, ski hills,

mining operations, survey lines must be considered in overall integrated resource management.

The impact of logging roads is minimized by laying out road systems to cause a minimum of disturbance and by reclaiming some roaded land after logging. Skid roads can be built so that the land can be reseeded as long as soil compaction and disturbance are minimized.

Impact
Roads, landings and skid trails are planned and built to have a minimal effect on the forest land base. The impact can be minimized but over the long term roads will reduce the land area occupied by forests.

4.3.3 Gravel Pits and Other Industrial Land Uses

The government and companies involved in road building clear areas of land specifically for access to gravel deposits. These gravel pits remove only minor areas from the forest land base but can become hazards to cattle and a visual eyesore.

Impact
Gravel pits are necessary for road construction and maintenance and cause a minor reduction to the forest land base but create range management problems.

4.3.4 Subdivision Growth

Although the growth in housing impacts more directly on agriculture land in the Okanagan/Shuswap some forests are cleared on smaller acreages, such as "hobby farms". This cutting of trees provides a short term supply of logs to mills but the land is rarely reforested. At present there is no law in British Columbia that requires reforestation on private lands cleared for any reason. In other countries private forests are considered as public and reforestation is required in some instances. The main impact from subdivision growth is from the demand for water, roads, recreation facilities, and other indirect forest land uses.

Subdivisions result in the forest and range land base being divided into smaller unit areas. This affects recreation and wildlife habitat, and reduces the operability of range lands.

Impact
Although the use of land for subdivisions does not always directly impact on the forest land base it has a significant effect on range and wildlife management. The increase in population creates an increase demand for water, recreation, etc.

4.4 Outdoor Recreation

4.4.1 Increased Demand for Public and Commercial Recreation

Tourism and local recreation are rapidly expanding sectors of the economy of the Okanagan TSA. The Coquihalla Highway to Kamloops has had an impact on tourism in the northern part of the TSA and the Peachland extension will have a major impact in the south. Population growth in the region is largely attributable to the hospitable climate and diversity of outdoor recreation resources, including a pleasant visual landscape. These factors combine to create increased demands for a range of private and public outdoor recreation services and facilities.

It is estimated that the demand for outdoor recreation is increasing at a rate of 10-15% per year. This has a major impact on the range and timber responsibilities of the Ministry of Forests as well as recreation. Although it impacts on forest management, the demand for more recreation facilities can be accommodated with a modest impact on the Allowable Annual Cut. Of greater significance is the impact of increased demand for naturally appearing landscapes, preservation of diversified fish and wildlife species and populations and for year round access. Also recreationists are demanding more backcountry and wilderness opportunities and this could have a major impact on forest land available for timber production.

Impact

Although the demand for recreation facilities such as campsites, trails and associated parking lots etc., will not have a major impact on timber and range use, increasing demands by recreationists for natural landscapes and wilderness areas, and preservation of fish and wildlife resources, will have a significant impact on timber harvesting and range utilization.

4.4.2 Increased Demand to Retain Naturally Appearing Landscapes

The public is increasingly concerned about the visual impact from traditional road building and logging practises. Often tourists are unhappy with the sight of logging clearcuts adjacent to recreation developments or within sight of lakes. Leave strips along roads and modified logging practises, such as selection logging and smaller clearcuts, can reduce the visual impact of logging without having a major impact on the harvest. Large preservation areas, however, could have a major impact on the area available for timber management.

Naturally appearing landscapes are important marketing features of most commercial outdoor recreation developments. A reduction in

landscape quality may have negative economic impacts, particularly on back country recreation suppliers who market natural landscapes as part of the recreation experience.

Impact
Initial studies show that protecting the main corridors will have an impact of reducing the Allowable Annual Cut by about 2.5 percent over the entire TSA.

4.4.3 Management of Vehicle Access

Although vehicles pose problems for management of some resources, (eg. range, wildlife, recreation) they do not impact on the AAC. The use of snowmobiles and ATVs may have to be restricted in some wilderness and environmentally sensitive alpine areas to maintain a natural setting.

4.4.4 Public Demand for More Wilderness and Protected Areas

Although a wide variety of recreation opportunities are available to residents and visitors in the Okanagan TSA there is relatively little wilderness. Wilderness is classified as lands providing for semi-primitive and primitive recreation use. While 6.3% of the Province as a whole has been protected for parks and wilderness only 0.6 % of the Okanagan TSA is in these protected categories.

Impact
An increase in wilderness areas could have a major impact on the forest land base available for timber harvesting and cattle grazing. The impact in the southern part of the TSA will be greater than in the north.

4.5 Range

4.5.1 Timber Harvesting

There are a number of range issues related to timber harvesting. These are:

1. Logging often disrupts grazing systems. Cattle are lured out of the forest by open spaces created by clearcutting.
2. Logging increases the forage productivity for 10 to 20 years due to an increase in sunlight reaching the forage plants.
3. Logging slash may impede the movement of animals.
4. The quality of range and length of season can be increased by seeding logged areas to domestic forage.
5. Logging may damage range improvement structures (fences, trails, water developments) or make them unworkable.
6. Logging roads increase the mobility of cattle and managers.

7. Many grazing areas have become dependent on a steady rate of logging for a continual supply.
8. Logging reduces the effectiveness of natural barriers. (See Section 4.5.4)

Impact

1. **Reorganizing grazing plans after logging cost industry and government time and money.**
   - **Damage to tree seedlings may occur if plans are not redone.**
   - **Stocking rates may be reduced.**
2. **An increase in sunlight may increase stocking rates.**
3. **Slash may make forage unavailable for cattle or wildlife.**
4. **Seeding with domestic forage species may increase wildlife populations or they may become more healthy.**
5. **Damage to range structures may make livestock management impossible.**
6. **Increased mobility of livestock may cause distributions to become better or worse. Cattle may move out of their grazing area.**
7. **Grazing allocations may vary depending on level of logging.**
8. **Grazing opportunities are lost adjacent to absent barriers.**

4.5.2 Reforestation and Range Interactions

There are a number of related issues in the interaction between reforestation and range:

1. Livestock may damage young trees.
2. Livestock can reduce vegetation that may compete with trees.
3. Seeding domestic forage may enhance the ability of livestock to control vegetation competing with the tree crop, or may increase the level of competition.
4. Some silvicultural treatments make clearcuts unusable or increase the potential for cattle damage.
5. Spacing and thinning increases forage production but may leave areas unaccessible to livestock and wildlife.

Impact

Each of these has an impact on the range program:

1. **If damage is excessive there may be pressure to reduce grazing on clearcuts.**
2. **Contracting of ranchers to use livestock to control vegetation may increase.**
3. **There may be pressure to increase or decrease seeding.**
4. **The opportunity to graze some areas will be lost.**
5. **The carrying capacity of affected ranges may be increased or decreased.**

4.5.3 Increased Demand for More Grazing Areas

There has been a strong and steady demand for additional range capacity, especially spring and fall ranges. This demand could be met by more intensive management but most grazing systems are based on extensive management. Switching to intensive management is a low priority to the Forest Service.

Impact

There will be an ongoing demand for additional forage; strong for spring and fall range and less for summer range.

4.5.4 Loss of Natural Barriers

Removal of timber barriers between major watersheds has created a cattle control problem in many areas. For example, this occurs in the Pennask, Whiterocks and Gottfriedsen Mountain and Carmi areas. Dense ungrazeable stands of lodgepole pine and spruce had separated cattle from the Nicola Valley from those in the Okanagan Valley. Recent logging has made holes in this barrier and future logging will further reduce the barrier.

Mixing of cattle on summer range results in cattle returning to the wrong wintering areas. The costs of retrieving cattle and the disruption to planned grazing systems are severe enough to keep ranchers from pushing cattle near the breached barriers. Large amounts of readily available forage are therefore not used.

Impact

Ranchers will be forced to reduce range use in areas where natural barriers are affected, and concentrate cattle elsewhere.

4.5.5 Increased Urbanization

The major impact of increased urbanization on range use will be a reduction in area of range land due to subdivision development and the need for more intensive range management in community watershed areas.

Impact

Future ranging of cattle in some watersheds may be more restricted in the future especially near major population centers. The increased urbanization often decreases adjacent range use and increases recreational use. The water issue will have the greatest impact in the south part of the TSA where water supplies are more limited.

4.5.6 Noxious Weeds

Reduction of forage supply on range for livestock and wildlife has occurred through infestation of noxious weeds, especially knapweed. Houndstongue, dalmation toadflax and sulfur cinquefoil are of more recent concern and are infesting increasingly large areas. Knapweed is beyond the containment stage in the southern half of the TSA. The priority is to restrict its spread to the north and to other TSAs.

Impact

If knapweed and other noxious weeds are not controlled there will be a decrease in the availability of spring and fall forage for livestock and wildlife.

4.6 Water and Watershed Protection

Water is a major issue in the southern part of the TSA and less critical in the north. The demand for water increases as populations grow. Commercial and industrial activities and tourism and recreation increase demands for water and create management problems. Timber harvesting may have a major impact on water and watersheds, depending on the harvest level and quality of operations.

Water quality is affected by siltation, increased water temperature and water quantity by increasing and changing the timing of peak stream flows. Logging road construction has the largest single effect on water quality, although poor logging practises may also damage soils and degrade water quality. Poorly designed and built roads can increase erosion, gullying and siltation. The damage from skid and haul roads can be minimized by design and reclaiming the land once the road is no longer used. As mentioned earlier, roads can impact on up to 20% of a cutting area so the impact on watersheds can be substantial. The Ministry of Forests has worked with other agencies to develop the Okanagan Timber Supply Area Integrated Resource Management Guidelines for Timber Harvesting to provide a framework for consistently sound timber harvesting practises, which includes guidelines for minimizing the impact of road building on water and watersheds.

Reforestation has a positive impact on water as the sooner an area is planted or reforested naturally, the sooner the effects of logging are minimized.

Overgrazing, corrals and heavily used stock trails can cause soil erosion and siltation as well as increasing peak stream flows. Too many animals in critical watersheds which produce water for human consumption may increase the coliform content in the water above acceptable levels.

An increased demand for range near developing communities will result in conflict between range and water uses.

Impact
As the demand for water increases, logging and road building systems will have to be very carefully implemented to protect watersheds. Selection logging has less impact on water but may result in more roads, as a larger area must be managed to produce the same level of cut. These systems will be more costly and will result in a reduced cut from some critical watersheds. Range management may have to be modified further in critical watersheds to maintain water quality. Recreation use that is not compatible with water quality and conservation may have to be more intensively managed or controlled.

4.7 Fish and Wildlife Habitat

There is an ever increasing demand to protect more areas for fish and wildlife. This may result in the preservation of some areas and management systems being modified. Selection logging systems are better than clear cuts for wildlife in some situations, although increased road systems and access will create other problems. Managing the rate of cut in watersheds important to fisheries is necessary to maintain water quality and quantity. The limiting factor to wildlife populations is often the amount of wintering area which is usually bottom lands that are the most urbanized and privately owned.

An increased protection of wildlife and wildlife habitat will have a positive effect on recreation and tourism as opportunities for hunting and the viewing of wild animals and birds will increase. Fish and wildlife are often the attractions which bring users to Forest Service trails and campsites.

Impact
The preservation of fish, animal, bird and other wildlife habitat will continue to be a priority to the public. This will result in an increase in preservation areas and the modification of timber harvest and range in other areas. This will mean a reduction in the operable forest land base for timber production and increased problems in range management.

4.7.1 Riparian Management

Riparian areas are the wet soil areas adjacent to streams, lakes and wetlands. These areas have high water tables and grow water dependent plants such as willow, aspen, cottonwood, spruce and cedar. Though riparian areas only account for a small part of the natural landscape, they are very important to fish and wildlife. Of all wildlife in

the TSA it is estimated that over 80% use riparian and adjacent uplands during some season or part of their life cycle.

The past practice of clear cutting to the stream's edge with understory protection did not address fish and wildlife habitat needs, nor did it address the potentially negative impact on water quality or streambank stability within community watersheds. The Okanagan Resource Guidelines provide for the maintenance of healthy and mature trees in riparian areas. This meets many basic habitat requirements such as providing shade and maintaining bank stability while also providing large organic debris which slow down water velocity, create pools, trap gravel, and generally add to stream stability.

Impact
Protection of riparian areas may result in reduced timber production and cattle range availability thus impacting on the AAC and AUMs.

4.7.2 Biodiversity

Biodiversity is the maintenance of the wide variety of plant, animal and insect species in a wide range of different forests. The TSA supports the greatest diversity of wildlife in the Province. The habitats range from the desert near Osoyoos to glaciers near Revelstoke and each habitat supports its own variety of wildlife.

A decade ago wildlife management was directed at those species that were traditionally hunted or trapped. British Columbians are now demanding that more emphasis be placed on non-game wildlife. The wildlife program has responded by adopting as its first goal, "To maintain, enhance wildlife and their habitats, and thus ensure an abundant, diverse and self-sustaining wildlife resource throughout British Columbia." This goal reflects the wishes of the public in maintaining and ensuring the continued survival of wildlife populations.

Natural regeneration is the best system of regeneration to ensure biodiversity but regeneration delays and brush problems will occur. Planting of trees from nurseries has been the approved method of re-establishing forests, so new methods of natural regeneration will have to be encouraged to replace planting.

Old Growth Forests

While some older second growth forests that were established by wildfire or other natural disasters are now being harvested, the forest industry in the TSA is based primarily on harvesting old growth forests. This situation will continue until more second growth forests are harvestable. This will have a significant impact on those wildlife species

requiring old growth forests to survive, such as marten, caribou, fisher, pileated woodpecker, etc.

The majority of the existing old growth forests are in the northern inaccessible areas of the TSA within the wetter biogeoclimatic zones. To address all wildlife species requiring old growth it will be necessary to maintain a distribution of old growth forests within watersheds that represent each biogeoclimatic zone.

Wildlife Trees

There are a large number of wildlife species that are dependent on dead or dying trees for at least part of their life cycle. Current Worker's Compensation Board regulations preclude maintaining wildlife trees on any active cutting permit. In view of the current WCB regulations regarding the falling of snags, wildlife tree objectives must be met by reserving areas within which no logging would occur and by killing live trees that would become wildlife trees in the future.

Impact

Protecting old growth forests and maintaining biodiversity may require a reduction to the forest land base thereby reducing the AAC and available cattle range.

4.7.3 Private Land Development and Fish and Wildlife Habitat

It is estimated that 50% of the deer, elk and sheep winter ranges in the TSA are on private lands. These lower elevation lands are slowly being developed for agriculture, housing, hobby farms, etc. and are no longer available for wintering wildlife. This continued development on private land, over which the Ministry of Environment has no control, will result in more emphasis on wildlife habitat protection on Crown land. To reduce conflicts with agriculture and wildlife, more intensive management will be required on Crown land.

Impact

To meet existing wildlife demands, more intensive management for wildlife will occur on lands managed by the Ministry of Forests, thus affecting timber and range availability.

4.7.4 Mountain Pine Beetle Management and Fish and Wildlife Habitat

The level of mountain pine beetle infestations in the Okanagan TSA has caused special problems for wildlife managers. Large clearcuts and accelerated cut rates result in habitat alterations that adversely affect some species of wildlife. Temporary uplifts in the AAC will also affect future wildlife habitat considerations.

Large continuous clearcuts reduce the available edge-to-area ratio. Most browsing by deer, moose, elk, etc. occurs along this edge. Much of the central area of large clearcuts is unavailable as large animals are reluctant to venture far from cover to forage. Present beetle management strategies tend to replace more diverse forest systems with less diverse ones as various different aged species are replaced with more even aged, single specie stands. This may result in eco-simplification and a reduction in biodiversity. Increasing the AAC will quicken the rate at which lodgepole pine stands are harvested. As these stands are diminished, harvesting pressure will increase on lower elevation fir types which are critical winter range, and higher elevation spruce-balsam stands which are important furbearer habitat as well as ungulate summer range. Accelerated harvest rates can also affect water course stability and fisheries resources.

Impact
The impact on the wildlife and fisheries resources of current harvesting of mountain pine beetle infested stands may limit future wood supply.

4.7.5 Range and Fish and Wildlife Habitat

Wildlife and range interests can coexist if proper range and wildlife management is undertaken. Overstocking, inadequate monitoring of range activities and inadequate cattle control can impact on sensitive wildlife habitats and the amount of forage available to the various species of wildlife. Sensitive habitats include riparian areas, subalpine habitats, winter ranges, dry grasslands, and grizzly habitats. Dry grasslands are of particular concern as cattle over-grazing can severely impact the natural vegetation, resulting in a complete change of the native vegetative community. Many of the species of management concern are found in this dry grassland habitat.

Impact
To better meet wildlife needs, stocking densities may have to be reduced in some areas and new grazing opportunities will have to better accommodate wildlife considerations.

4.7.6 Silviculture Methods and Fish and Wildlife Habitat

Various silviculture methods impact upon fish and wildlife habitat. For example, broadcast burning reduces the amount of dead woody material on the forest floor. Many species depend on this material for their survival. Herbicide use reduces vegetative species diversity and shortens the early successional stage of forest growth. This serves to reduce forage and cover for many wildlife species. The pruning of a tree's lower limbs to provide better peeler logs removes the lower lichen producing limbs. Species such as caribou and deer use this lichen to

sustain themselves during the winter. From a fisheries perspective, a main objective of silviculture can be to protect riparian vegetation and therefore water quality.

Impact
As the emphasis increases on the maintenance of biodiversity, the use of various silviculture methods such as herbicide use, broadcast burning, and other methods of site preparation may become restricted. As a result, future wood supplies may be affected.

4.8 Slash Burning/Smoke Management

The forest management reason for slash burning is to remove logging debris after logging. This has two effects; it prepares the site for planting and reduces the potential for future wildfire.

The present policy of the Ministry of Forests is:

1. To continue to permit burning under site specific conditions according to the Ministry's Prescribed Burn Policy.

2. To permit burning only under conditions which will allow smoke management objectives to be successfully addressed.

Impact
This policy restricts but does not eliminate slash burning. This should greatly reduce the impact of slash burning on communities in the Okanagan TSA.

4.9 Ecological Reserves

There is a growing public demand for the preservation of representative ecosystems. The ecological reserve program was initiated in the 1970s. The purpose is to protect unusual or special ecosystems or species. The ecological reserves is one of the programs designed to help protect old growth and biodiversity. There are 15 ecological reserves in the TSA and more are in the proposal stage.

Impact
Setting aside areas for Ecological Reserves could result in reductions to the forest land base.

4.10 Use of Herbicides

There has been a lot of controversy over the use of herbicides in the forests of British Columbia and some of the public will continue to demand its banning. In many instances herbicides are easier to use, cheaper and more effective than mechanical or manual means.

Impact
Restricting the use of herbicides would greatly increase the cost of silviculture and render some sites very difficult to manage which could reduce the AAC.

5.0 Public Participation

5.1 Public Involvement

The Okanagan Timber Supply Area is one of the most complex natural resource areas in the Province. There is a diverse mix of forest types from the dry bunchgrass and ponderosa pine areas in the south to the wet cedar and hemlock forests in the north each with a diverse fish and wildlife population. The Okanagan trench has one of the highest population densities in the Province. There is a wide range of economic activities that rely on the forest resource including tourism, recreation, logging, milling and ranching. Other industries indirectly rely on the forests of the area. Water is a limited commodity in some areas and the forests in watersheds play an important role in water conservation.

All of these factors indicate that the Ministry of Forests needs the input of communities and the public if acceptable forest uses are to be planned and managed.

5.2 Open Houses

With the above in mind the Ministry set up a two stage public participation process in the development of the Options Report.

5.2.1 Open Houses, June 18 to 27, 1990

The first stage involved a series of Open Houses in five communities:

Kelowna	June 18 and 19
Penticton	June 20
Keremeos	June 21
Vernon	June 22 and 23
Salmon Arm	June 26 and 27

Prior to the Open Houses the Ministry identified issues that its planning, recreation, range, silviculture and timber management staff thought were important. These are outlined in Section 4 of this report. Maps were developed that give a visual presentation of the different resources from recreation, wildlife, timber, range, water, fisheries, as well as maps that present special problems such as the mountain pine beetle, visually sensitive areas, population densities, etc. These "Issues" and the planning process were outlined in a newsletter that was mailed out to 900 people before the Open Houses took place.

The Open Houses were advertised two to three weeks in advance in the newspapers and on radio. The Open Houses were set up with a questionnaire that each person picked up at the door that assisted her or him to view the maps and issues statements. A video outlined the Ministry of Forests planning process so that people could get a better idea of where the Option Report fits in the bigger picture. A number of staff were available to answer questions. Of the 459 people who attended, some spent almost three hours analyzing the maps and discussing issues. Most people spent at least an hour. People were encouraged to fill out the questionnaire before they left the hall and 243 did so. This level of participation indicates a high level of interest and concern.

The information gathered at the Open Houses was used to prepare a draft of the Options Report.

5.2.2 Open Houses Fall of 1990

A second round of Open Houses will be held in the fall. The purpose of these Open Houses will be to present the results of the first meetings back to the public and also to present the draft of the Options Report. The public will be requested to comment on the information and to make sure that the majority of people's concerns are represented. Another newsletter and questionnaire will be used to assist people in dealing with a lot of information. The results of this questionnaire will be analyzed to ensure that the Options Report reflects people's concerns.

5.3 Results of First Questionnaire

As shown in the following table, 459 people attended the Open Houses and 319 filled out the questionnaire.

Table 22
People Who Attended the Open Houses

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Average or Total*
Attended	121	88	22	165	63	459
Ques. Completed	65	49	10	94	25	319
% Ques. Completed	54	56	45	57	40	53%
Urban Dwelling	28	20	3	48	10	140
Rural Dwelling	31	25	7	41	14	154
No. City/Rural Not Answered	6	4	0	5	1	25
No. Wrote in Issues	61	42	8	73	24	277
% Wrote in Issues	94	86	80	78	96	87%

*TSA total includes questionnaires mailed in.

The table shows that of the 53% of the people who attended filled out the questionnaire. Of the 319 people who filled out the questionnaire, 277 or 87% took the time to write in the Issues section. That information will be helpful in developing the Resource Management Options.

Appendix 4 shows an analysis of comments made in the Questionnaire.

The following table shows the priority that people put on the various Issues. As shown, more than half the people gave a high priority to Silviculture and Reforestation, Water, Timber and Jobs and Fish and Wildlife.

Table 23
Issues and Priority

	Issues	HIGH No.	HIGH %	MEDIUM No.	MEDIUM %	LOW No.	LOW %	N/A* No.	N/A* %
2	Water And Watershed Protection	272	85.3%	31	9.7%	2	0.6%	14	4.4%
6	Silviculture and Reforestation	270	84.6%	24	7.5%	6	1.9%	19	6.0%
5	Timber Production and Forest Industry Jobs	220	69.0%	52	16.3%	25	7.8%	22	6.9%
3	Fish and Wildlife Habitat Protection	210	65.8%	90	28.2%	6	1.9%	13	4.1%
10	Preservation of Wilderness Areas	166	52.0%	86	27.0%	43	13.5%	24	7.5%
8	Slash Burning and Smoke Management	148	46.4%	98	30.7%	52	16.3%	21	6.6%
1	Population Growth and Changing Land Uses	144	45.1%	117	36.7%	35	11.0%	23	7.2%
9	Old Growth and Biodiversity Preservation	140	43.9%	89	27.9%	68	21.3%	22	6.9%
7	Protection of Naturally Appearing Landscapes	120	37.6%	126	39.5%	56	17.6%	17	5.3%
12	Economic Expansion in the Okanagan/Shuswa	97	30.4%	121	37.9%	64	20.1%	37	11.6%
4	Oudoor Recreation	97	30.4%	147	46.1%	61	19.1%	14	4.4%
11	Range and Cattle Grazing	61	19.1%	140	43.9%	93	29.2%	25	7.8%

*N/A - issues where no response was made

6.0 Resource Management Levels

The purpose of this section is to discuss various management levels for the resources that come under the Ministry of Forests mandate (timber, range and recreation) in light of the issues identified as important by the public.

6.1 Timber

6.1.1 Continue Historical Performance

This management level will maintain the present cut at 2.7 million m^3 for the foreseeable future.

Assumptions:

- AAC will remain at 2.7 million m^3 for the next five years.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- The forest land base currently supporting forestry activities will remain constant at approximately 1 million hectares.
- This land base will produce approximately 2.3 million m^3 of timber annually in the long term.
- All harvested areas will be reforested to a minimum level.
- Problem timber types that are now inaccessible or are on difficult to log sites or where the timber is of poorer quality will be harvested.
- The forest inventories and long term timber yield calculations will be accurate.
- The population will continue to grow at approximately 2% per year.
- With completion of the Coquihalla Highway there will be an increase in tourism as predicted by the regional districts.
- Current public awareness/expectations on environmental issues such as the preservation of old growth and wilderness areas, biodiversity, and wildlife and fisheries habitat protection will remain constant in the foreseeable future.

Implications:

- The cut level can be maintained for about twenty years then there will be a shortage of harvestable timber and the falldown effect will occur, causing wood shortages to some mills.
- There will be a loss of jobs and reduced economic activity in the logging and milling sectors in 20 years. Indications are that the forest land base is being reduced throughout the Province from other land uses such as highways, community growth and hydro rights of way.

- If a fairly constant land base and population growth is assumed, there will be water quantity and quality problems in some community watersheds.
- Increased tourism will result in an increase in recreation demands for wilderness experiences, visually pleasing landscapes as well as other land uses that may conflict with timber harvest activities.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses.
- Current public awareness of environmental issues translates into demands for conservation of old growth forest and wilderness areas and wildlife and fisheries habitat protection. It will be difficult to meet these demands and still maintain a constant forest land base and AAC.

6.1.2 Maintain Cut at 2.7 million m^3 with Incremental Silviculture

Assumptions:

- AAC will remain at 2.7 million m^3 for the next five years.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- The silviculture program will be increased to include the reforestation of all backlog lands, with basic on all cutover lands and incremental silviculture (juvenile spacing, fertilization) on the better sites, thus increasing the long term timber supply.
- The population in the TSA will grow at the anticipated 2% per year.
- The forest land base will gradually be reduced by other uses such as community growth or community watershed protection.
- Recreation and tourism will grow at the anticipated 15% per year.
- Water, wilderness, wildlife issues etc. will continue to become more important.
- There will be an increase in selection harvesting to address watershed protection and visual quality concerns.
- All other assumptions as in Section 6.1.1.

Implications:

- An increase in silviculture could partly offset the impact of a gradual reduction to the forest land base. The challenge will be to grow more wood on less land.
- Increased silviculture and changing harvesting methods to selection logging and smaller clearcuts could partly offset the

impact of logging on other resources such as water, wildlife and visual aesthetics.
- An increase in Ministry of Forests staffing will be required to administer a greatly expanded silviculture program.
- An increase in silviculture will create jobs in this sector.
- Increased population pressures, increased tourism and general public expectations for wilderness, oldgrowth, biodiversity, smoke management, protection of wildlife values etc. will make it increasingly difficult to maintain the cut on a declining forest land base.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses.

6.1.3 Increase the Cut to 3.1 Million m^3 with Incremental Silviculture

This management level examines the possibility of increasing the AAC from the present level by 400,000 m^3, to 3.1 million m^3.

Assumptions:

- The AAC will be raised by 400,000 m^3 to 3.1 million m^3.
- The temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations will be a part of the 400,000 increase.
- All harvested areas will be reforested but a substantial increase in incremental silviculture could marginally increase the wood supply in the short term and substantially increase it in the long term.
- A silviculture strategy could be developed for the TSA that will determine the appropriate silviculture treatments to address future timber supply problems. The level of silviculture will be as in Section 6.1.2 as well as rehabilitating one half of the areas having non-commercial species with a commercial timber crop, over the next 10 years.
- The forest land base will remain constant at approximately 1 million hectares.
- All other assumptions will be as in Section 6.1.1.

Implications:

- The forest land base will remain constant but with added pressures due to an increase in the cut.
- Increasing the AAC now will have the effect of reducing the volume of mature timber available for the future. The falldown will happen sooner and mature volumes available for harvest in 20 years will be reduced.

- There will be an immediate increase in jobs and economic activity in the TSA. As each 1,000 m^3 of AAC produces one direct job and 2.6 indirect jobs, there will be 1,440 new jobs created.
- As the mature timber supply is utilized, there would be a reduction in the AAC adding to the falldown effect. This could be partially offset by the increased silviculture program.
- An increase in Ministry of Forests staffing will be required to administer a greatly expanded silviculture program.
- An increase in silviculture will create jobs in this sector.
- The AAC could be increased gradually by 40,000 m^3 per year over the next ten years to allow for the adjustment of resource management issues to the increased cut.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses.
- If there are increases in population, demands for recreation and other forest uses, an enlarged cut will increase management problems on a constant land base.
- Public expectations for wilderness, old growth, biodiversity, smoke management, protection of wildlife values, etc. will be difficult to meet.

6.1.4 Decrease in Cut to 2.3 million m^3 over Ten Years

This management level examines the possibility of reducing the AAC from 2.7 million m^3 by 400,000 m^3 to 2.3 million m^3 by the year 2000.

Assumptions:

- The AAC will be gradually reduced from 2.7 to 2.3 million m^3 over ten years.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- The forest land base will gradually be reduced to accommodate issues such as community growth, wilderness areas and old growth protection, wildlife habitat protection and the maintenance of visually appealing landscapes.
- Public awareness and demands on environmental issues will increase.
- The AAC will be reduced by 40,000 m^3 per year for ten years.
- All other assumptions will be as in Section 6.1.2.

Implications:

- A gradual reduction in the AAC will give the Province, communities and companies the time to increase productivity, value added manufacturing and secondary manufacturing to

partially or wholly offset the estimated loss of jobs and economic activity.

- An increase in silviculture to more intensive management while reducing the AAC will minimize, if not eliminate, the effect of the predicted falldown in timber supply.
- An increase in silviculture will create jobs in this sector.
- Increasing silviculture and reducing the AAC will allow resource managers more flexibility in taking into account population growth, increased demands for water, and the protection of watersheds, wildlife, old growth and wilderness as demanded by the public.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses.
- The major tenure holders and small business program will have reduced wood supplies from Crown land sources.
- Old growth timber will be removed at a slower rate.
- It will be easier for resource managers to satisfy demands for outdoor recreation and visually pleasing landscapes.

6.1.5 Immediate Reduction of the AAC to 2.3 million m^3

This management alternative is similar to 6.1.4 except that the AAC will be reduced in one year.

Assumptions:

- The AAC will be reduced next year by 400,000 m^3 to 2.3 million m^3.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- Other assumptions as in Section 6.1.4.

Implications:

- The major tenure holders and small business program will have reduced wood supplies from Crown land sources.
- Approximately 1,400 jobs will be lost in the forest industry.
- Some mills may shut down and others may curtail production.
- Communities, especially those more reliant on the woods industry, will suffer economically.
- The falldown will be put off farther into the future as there will be less timber supply problems in the future.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses.
- Other implications as in Section 6.1.4

6.2 Recreation

6.2.1 Historical Performance

This level of management will allow for routine maintenance and rehabilitation of existing Forest Service sites and trails to meet minimum safety, environmental and sanitation standards. The Ministry will not fund development of new facilities or the routine maintenance of sites or trails built by others. Recreational planning will be inadequate to serve the need and action will be confined to developing basic inventory information. The Ministry will provide limited response for aesthetic management, preservation of recreation resources and will not meet the increasing demand from the public for integrated resource management at the local level. Although the importance of the recreation program for tourism is well known, the ability of the program to meet the increasing demand will be limited.

Assumptions:

- Demands for all forms of public and commercial recreation will increase.
- Demands for more wilderness and preservation will increase beyond historic levels.
- Demands for maintaining natural appearing landscapes will increase.
- All recreation users will demand more input into the resource planning process.
- As demands increase so will the need for more staff and funding to manage all aspects of the recreation program.

Implications:

- Present and historic levels of recreation management and funding will not satisfy the increasing demand.
- User satisfaction will decrease due to gradual deterioration of existing sites and the lack of new sites.
- Existing sites will be over used and maintenance will become more difficult and costly.
- As more of the TSA becomes roaded it will become more difficult to satisfy the demand for wilderness and recreation in primitive and semi primitive settings.
- As visual landscapes become an important management issue the Ministry will not be able to meet public demands for staff time and the costs of public participation and visual landscape studies.
- There will be a loss of jobs and economic benefit in the outdoor recreation aspect of the tourism industry.

- The Ministry's credibility as a manager of forest associated recreation will diminish.

6.2.2 Basic Recreation Program

There is an increasing public demand for recreation and tourism is a growing industry in the Okanagan. This management level will maintain existing facilities and provide for the development of new facilities to satisfy the increasing demand. It will also allow the program to deal with public concerns for recreation planning and recreation opportunities.

Assumptions:

- Demands for public and commercial recreation will increase.
- Ministry will respond to public demand for aesthetic quality.

Implications:

- This option will closely meet the public demand for recreation opportunities.
- Greater use and satisfaction will have a positive impact on the tourism industry.
- This will result in a more orderly management of dispersed use locations and minimize problems associated with overcrowding, sanitation, fire hazard and site degradation.
- The Ministry will respond to landscape and aesthetic quality issues.
- There will be an increase in jobs and economic activity in the tourism industry.
- Increased recreation will present problems of water, wildlife and other resource management issues.

6.2.3 Enhanced Recreation Program

This management level assumes there will be an increasing demand in the Okanagan/Shuswap for outdoor recreation including preserving the visual quality of landscapes, wilderness and a broad range of aesthetic and amenity resources. This program will provide enhanced facilities for all types of forest recreation. The public will increasingly demand full participation in the planning process and under this program the Forest Service will have the staff and funding to effectively deal with all recreation issues.

Assumptions:

- There will be an increasing demand for all types of forest recreation.
- Forest Service staff and funding for the recreation program will be substantially increased.

- The public will continue to demand full participation in integrated resource planning of all forest resources including recreation.

Implications:

- The Forest Service will meet the increasing demand for forest recreation.
- There will be a high level of user satisfaction.
- The forest recreation program will make substantial contributions in terms of employment and economic benefit to the tourism industry in the Okanagan/Shuswap area.
- The public will be fully involved in a more comprehensive integrated resource planning process.
- The Forest Service will be better able to meet the public demand for visual landscape and aesthetic quality.

6.3 Range

6.3.1 Historical Performance

This is based on the average level of the range management over the last five years. This level does not provide for the maintenance of 90,882 Animal Unit Months (AUMs).

Assumptions:

- The demand for range on Crown lands will increase.
- The Forest Service will not allocate more funding or new staff to the range program.
- The public will demand more advisory services and involvement in planning of the range program.
- Present authorized use will not be maintained.

Implications:

- Range conditions will slowly deteriorate over time.
- The area infested by weeds will increase.
- There will be little or no opportunity for seeding so forage opportunities in clearcuts will be lost.
- There will be little or no opportunity to respond to emergency situations such as loss of natural barriers, water shortage, poisonous weeds, etc.
- There will be increasing management conflicts in dealing with other resource users such as water, wildlife and some silviculture situations.

- The Forest Service will not be able to satisfy the demands of the ranching industry and jobs and economic opportunity will be lost.
- Range availability and operability will decline.

6.3.2 Basic Range Management Level

This management level will maintain the basic level of forage production, maintain range conditions and provide the resources to contain outbreaks of noxious weeds.

Assumptions:

- Authorized use will be maintained at 90,882 AUMs.
- Increased urbanization and the loss of forests will reduce effective range.

Implications:

- Noxious weed containment program will be ongoing.
- Some seeding of clearcuts will provide improved forage for livestock operations.
- Problems of natural barriers, fencing, water development and trails will be dealt with.
- There will be a general improvement in range condition that will have a positive effect on water, wildlife etc.
- Weeds will be contained to current areas of infestation.

6.3.3 Enhanced Range Management Level

This management level will increase the licensed cattle on forest lands to 150,000 AUMs over ten years and increase the ability of the Forest Service to better manage range.

Assumptions:

- Range use will increase from 90,000 AUMs to 150,000 AUMs over ten years.
- New ungrazed areas in the northern part of the TSA will be developed.
- More intensive range use in established areas could be implemented.
- Seeding and fertilization will increase productivity in some areas.

Implications:

- This will be a major benefit to the ranching industry in terms of jobs and economic development.
- Progressing up to a 50% increase in range use will create potential conflicts with other range users particularly wildlife and recreation. This will be offset by intensified management.
- This increase could also create problems for silviculture where animals graze in young plantations.
- Increased forage production and water supplies could have a positive effect on wildlife.
- An increase to 150,000 AUMs could create problems in some watersheds that are community water sources. Extensive fencing, better planning and animal control could minimize this problem.
- Increase to 150,000 AUMs may create access, operability and management problems.
- The enhanced range program will provide the resources for the integrated control of knapweed and other weeds such as houndstongue, nodding thistle, toadflax, sulphur cinquefoil, leafy spurge, etc.
- At the enhanced level of management the public will be involved in the integrated resource planning of range with other forest resources.

7.0 Integrated Resource Management Options

The following integrated resource management options bring together the resource management levels discussed in Section 6.0, all issues discussed at the open houses and issues identified by the Ministry of Forests and other agencies into comprehensive management options. Given the complexity of the issues and the number of variables it is impossible to analyze all possibilities, especially at the strategic level.

Four integrated resource management options are discussed. The first is a basic option where all resource issues are considered but funding and staff will be limited to current levels for all programs including integrated resource management planning. In the second option there is increasing awareness of a broad range of issues and the Ministry will increase the funding and staffing for silviculture, range, recreation and integrated resource management planning. The third level, the non-timber values emphasis option, is where increasing public awareness and demands concerning environmental issues are more fully addressed. The fourth is a timber harvest option where the emphasis will be on increasing the timber harvest.

As described in sections 4.1.2 the mountain pine beetle is a special management problem, particularly in the southern part of the Okanagan TSA. The Ministry has granted temporary AAC uplifts of 200,000 m^3 annually since 1987 to manage the beetle infestation and to salvage damaged timber where possible. Ideal weather conditions last winter and this summer contributed to highly successful beetle flights which means the beetle will continue to spread at epidemic levels. Failure to salvage these beetle infested stands would result in further volume losses and future timber supply reductions. Given this emergency situation, in September 1990 the Chief Forester decided to temporarily increase the AAC by 200,000 m^3 for a three year period effective immediately. This temporary uplift is over and above the integrated resource management options presented below.

7.1 Current Resource Management Option

This option assumes that resource management will continue at current levels and staffing and funds for implementing the programs will remain at present levels.

Assumptions:

- The Allowable Annual Cut will remain constant at 2.7 million m^3 per year for the foreseeable future.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- The forest land base will remain constant at approximately 1,000,000 hectares.
- The recreation program will be set at the Historical Performance Level (See Section 6.2.1) which will not meet the expected increase in demand.
- The range program will be set at the Historical Performance Level (See Section 6.3.1) which will not maintain present authorized use.
- Ministry staffing, programs and funding levels will remain constant in 1990 dollars.
- All cutover lands will be reforested to a basic level.
- Cost of basic silviculture will be approximately $15,000,000 per year and will be paid for by licensees as defined in the ***Forest Act***. Ministry costs will be basically borne by stumpage from small business sales.
- The population will increase at an anticipated 2% annually.
- Current public awareness and expectations on environmental issues such as old growth protection, wilderness, biodiversity, smoke management, and wildlife and fisheries habitat protection will remain constant in the foreseeable future.
- Water quality and conservation will remain as one of the most critical issues in the TSA.
- There will be an increase in tourism as predicted by the regional districts as a result of the opening of the Coquihalla Connector.

Implications:

- The level of cut can be maintained for about twenty years then there will be a falldown effect causing wood shortages to some mills.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses.
- The Ministry will not be able to satisfy an increasing demand for recreation and range.
- Population growth will result in increasing demands for water which will be in conflict with timber, range and recreation in some watersheds.
- It will be difficult to provide for environmental issues, old growth, wilderness, wildlife, and biodiverstiy and still maintain the current forest land base for timber, range and recreation activities.

7.2 Increased Resource Management Option

Under this option the Ministry will increase the funding and staffing for silviculture, range, recreation and integrated resource management.

Assumptions:

- The AAC will remain constant at 2.7 million m^3.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- The forest land base will be gradually reduced by pressures of population growth and other issues. This will reduce the long term timber supply.
- A basic recreation program will better satisfy increasing demand (See Section 6.2.2).
- A basic range management program (See Section 6.3.2) will better satisfy present demands for weed control, fencing, trails, forage production and water provisions.
- The MoF will have the funding and staff to respond to a broad range of social and environmental issues.
- More selection and other alternative harvesting methods will be practised for aesthetic, water and environmental reasons.
- More problem forest types, where there are accessibility and merchantability problems, may be brought into production.
- There will be an increased expenditure in the silviculture program. In addition to conducting basic silviculture, the backlog of not satisfactorily restocked areas (NSR) will be reforested by the year 2000 at a cost of approximately $4,300,000.
- Juvenile spacing and fertilization will be done on selected stands at a cost of $4,400,000. This will have the effect of increasing the long term timber supply.
- Total silviculture costs are an estimated $23,700,000 per year.
- There will be adequate staffing to deliver the silviculture program.
- There will be an increase in selection logging.
- Forest health practises, as part of basic silviculture, will ensure that levels of forest pests will be manageable.
- All other assumptions will be as in Section 7.1

Implications:

- This level of cut will result in a falldown in 20 years although increased silviculture will increase the long term timber supply.
- The basic recreation program will satisfy the increasing demand for recreation opportunities but the resulting new facilities and increased use could conflict with water quality and wildlife protection in some watersheds.
- The basic range program will maintain authorized use through weed control, fencing, trails, seeding and water development.
- Some of the problems of wood supply could be offset by increased silviculture.
- Increased use of selection logging will reduce some water and wildlife problems.
- Increased population pressures, increased tourism, and general public expectations for wilderness, old growth biodiversity, smoke management, protection of wildlife values, etc. will make it increasingly difficult to maintain the cut on a declining forest land base.
- It will be possible to maintain current employment and economic benefits from forest harvesting activities in the short term.
- The increased silviculture program will allow for some reduced harvest in community watersheds in order to protect water quality and conservation efforts. The challenge will be to grow more wood on a smaller area.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses.

7.3 Increased Emphasis on Non-Timber Values Option

This option is similar to the option in Section 7.2 in that there will be enhanced resource management. In addition, there will be a gradual or immediate reduction of the AAC to better address increasing public awareness and expectations concerning environmental issues. Due to the mountain pine beetle epidemic there is a temporary AAC uplift of 200,000 m^3 for the years 1990 to 1992.

7.3.1 Reduce the AAC to 2.5 million m^3

This could be an immediate reduction of 200,000 m^3 or a gradual reduction (eg. 20,000 m^3 per year for 10 years).

Assumptions:

- The forest land base will be gradually reduced by population growth pressures and other issues such as old growth, wilderness, wildlife protection and the maintenance of visually pleasing landscapes.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- The recreation program will be at the basic level (See Section 6.2.2).
- The range program will be at the basic level (See Section 6.3.2).
- There will be increases in public demand for water, recreation and range.
- The public will increasingly demand special management for water, old growth, wilderness, wildlife, aesthetics, and other issues.
- Funding and staff will be provided for increased planning and public participation. This will involve other government agencies such as the Ministry of Environment and Fisheries and Oceans as well as the Ministry of Forests.
- Silviculture levels will be as in Section 7.2 but could decline from $23,700,000 as the cut is reduced.
- All other assumptions will be as in Section 7.2.

Implications:

- A declining AAC will provide more management alternatives to protect and enhance non-timber values.
- Less clearcut logging and more selection cutting will benefit recreation and tourism.
- Increased tourism and recreation could partially offset job losses and related economic spin-offs.
- A gradual change in the AAC annually rather than once every five years will create administrative and planning problems for government agencies and the forest industry.
- A reduction in the AAC and an increase in silviculture will make it easier to reduce harvesting in some community watersheds to protect water quality and quantity. This could also have benefits for fish and wildlife habitat.
- Reductions to the AAC will allow for some wilderness area protection, affording some protection for old growth forests and biodiversity.
- A reduction of 200,000 m^3 from the AAC will represent a loss of approximately 720 jobs. In addition, annual losses from economic spin-offs could be up to $3,800,000 of total government revenue and an annual loss of $28,000,000 that would be contributed to the economy as a whole.
- An immediate decrease in the AAC could have a severe impact on the economy, particularly for those communities that rely completely on the forest industry for their livelihood.
- A gradual reduction in the AAC could allow the Province and companies time to increase productivity, value added products and secondary manufacturing in order to offset anticipated job losses.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses. If the beetle epidemic persists beyond 1992 it will be difficult to manage with a declining AAC.

7.3.2 Reduce the AAC to 2.3 million m^3

This could be an immediate reduction of 400,000 m^3 or a gradual reduction (eg. 40,000 m^3 per year for 10 years).

Assumptions:

- Greater reductions to the forest land base than in Section 7.3.1 will more adequately deal with environmental issues.
- There will be a temporary AAC uplift of 200,000 m^3 per year from 1990 to 1992 to manage mountain pine beetle infestations.
- The recreation program, including landscape aesthetics, wilderness protection, and wildlife issues will be at an enhanced level. (See Section 6.2.3)
- The range program will be at a basic level (See Section 6.3.2)
- All other assumptions will be as in Section 7.3.1.

Implications:

- The reduction to the AAC will allow for forested areas to be set aside in order to address old growth, biodiversity, wilderness area protection and the maintenance of visually pleasing landscapes.
- The economic impact of a 400,000 m^3 reduction in the AAC will be the loss of 400 direct and 1040 indirect jobs, annual losses from economic spin-offs could be up to $7,600,000 of total government revenue and an annual loss of $56,000,000 that would be contributed to the economy as a whole.
- Resource managers will have more flexibility to take into account growing populations and increased environmental pressures.
- The 200,000 m^3 AAC temporary uplift will allow for better management of the mountain pine beetle epidemic and will reduce volume losses. If the beetle epidemic persists beyond 1992 it will be difficult to manage with a declining AAC.
- All other implication will be as in Section 7.3.1.

7.4 Timber Harvest Emphasis Option

With this option the AAC will be increased to 3.1 million m^3 per year. This could be an immediate increase of 400,000 m^3 or a gradual increase (eg. 40,000 m^3 per year for ten years).

Assumptions:

- The forest land base currently supporting forestry activities will remain constant at approximately 1 million hectares.
- A basic level of recreation will be maintained.
- The range level will be increased to 150,000 AUM's (See Section 6.3.3). This will be a gradual increase over 10 years utilizing forage from cut-over lands.
- All harvested areas will be reforested but a substantial increase in incremental silviculture could marginally increase the timber supply in the short term and substantially increase the long term timber supply.
- The level of silviculture will be as in Section 7.2 as well as rehabilitating one half of the areas with non-commercial species over the next 10 years. This will cost an additional $12,600,000 per year for a total silviculture expenditure of $36,300,000.
- Other assumptions as in Section 6.1.3.

Implications:

- It will become increasingly difficult for the TSA to provide mature accessible timber to manufacturing facilities after the year 2000.
- Provisions for old growth, wilderness and wildlife protection areas will become more difficult.
- There will be an initial increase in economic activity but the falldown will happen sooner and the effect will be greater into the second decade, putting more pressure on the forest land base.
- The increase in the AAC will allow for better management of the mountain pine beetle infestation over ten years.
- A gradual change in the AAC annually rather than once every five years will create administrative and planning problems for government agencies and the forest industry.
- This increase will provide for 400 direct and 1,040 indirect jobs over ten years, annual increases from economic spin-offs could be up to $7,600,000 of total government revenue and an annual increase of $56,000,000 that would be contributed to the economy as a whole

- With a constant land base and increased AAC it will be very difficult to maintain water quality and quantity in some community watersheds
- Increased tourism and recreation will result in greater demands for wilderness experiences and landscape aesthetics that will be difficult to meet with an increased cut.
- It would be difficult to have forest land base withdrawals for old growth and biodiversity and wilderness protection in the immediate future. Increased timber supply from silviculture could offset forest land base withdrawals in the long term.
- An enhanced range program will create conflicts in community watersheds, with recreationists (particularly over higher elevation areas) and with wildlife as outlined in Section 6.3.3.
- A gradual increase in AAC will allow other resource users to adjust to the increased timber harvest.

APPENDICES

APPENDIX ONE

GLOSSARY OF TERMS

Allowable Annual Cut (AAC): The rate of timber harvest from a specified area of land. The AAC for the Okanagan Timber Supply Area is determined by the Chief Forester of the Province.

Basic Silviculture: A term used to refer to the silviculture treatments that are carried out to ensure the establishment of a free-growing crop.

Biodiversity: The variety of living organisms in an area.

Biophysical Inventory: A forest inventory that includes all resource values including timber, wildlife, fish, soil, water, forage, recreation potential etc.

Brushing and Weeding: A silviculture treatment to remove brush and weed species which compete with seedlings for sunlight, water, and soil nutrients.

Clearcutting: The harvesting of all trees from an area of forest land in a single cut. This method is used where the successful establishment of a species is dependent upon or favored by open situations.

Ecological Reserve: An area set aside for the protection of a unique or representative ecosystem. Uses of reserves have a number of restrictions.

Environmentally Sensitive Area (ESA): Areas of sensitivity that reflect social, environmental, economic and technological factors. There are two levels of ESA; Level 1 - lands not suitable for sustained timber production; Level 2 - lands conditionally available to harvesting. The level therefore reflects the sensitivity of non-timber resources such as fisheries, wildlife, water, soils and recreation.

Falldown Effect: The decrease in the amount of timber available for future harvests in a management unit (Timber Supply Area or Tree Farm Licence) that results from an accelerated harvest of mature and overmature timber. As old growth timber is harvested and converted to second growth managed stands, less volume becomes available for harvesting because of shorter rotations and smaller tree size.

Forage: Grasses, small shrubs and other plant material that can be used as feed for livestock.

Forest Inventory: A program of the Ministry of Forests that develops, compiles and maintains a comprehensive information system for the forest resource.

Forest Land Base: The area that will be kept in forest for the production of timber, wildlife, water, recreation, range, etc. It is an important resource management concept as it makes very little sense to spend money on planting, weeding and spacing a young forest, seed road beds and remove culverts for water protection, seed areas for forage production to then have a hydro right of way, subdivision or other non forest use take the forest out of production.

Habitat: The place where an organism lives and/or the condition of that environment including the soil, vegetation, cover, water and food.

Herbicide: Chemicals used to kill plant species.

Incremental Silviculture: A term that refers to the silvicultural treatments carried out to maintain or increase the yield and value of forest stands over and above basic silviculture. Includes such treatments as site rehabilitation, conifer release, spacing, pruning and fertilization.

Integrated Resource Management: A process to identify, assess and compare all resource values as a basis for making decisions on resource use management. The process involves a consideration of social, economic and environmental needs.

Long Run Sustained Yield (LRSY): A measure of land base productivity for specified management assumptions. LRSY is determined as the long term sustainable level of the harvest forecast generated by a forest planning model. LRSY is a function of the size and productivity of the land base, the current growing stock, the length of the planning horizon, and the management assumptions (for example the assumed unsalvaged losses, regeneration delays, etc.) and how they are modelled. Roughly speaking, LRSY can be thought of as the Maximum Sustained Yield of a land base, adjusted upwards or downwards by the imposition of management objectives and constraints on the land base.

Not Satisfactorily Restocked (NSR): Productive forest land that has been denuded and has failed partially or completely to regenerate naturally or to be artificially regenerated within a specified period of time.

Reforestation: The natural or artificial restocking (ie: planting, seeding) of an area with forest trees.

Riparian Zones: Areas adjacent to water bodies. Very important for wildlife habitat and water values.

Selection System: An uneven aged silviculture system in which trees are harvested individually or in small groups continuously, at relatively short intervals.

Seral Stage: The series of changes occurring in the ecological succession of a plant community (e.g. pioneer stage, or climax stage).

Silviculture: The art and science of growing and tending a forest.

Spacing: The removing of trees from a stand to decrease the stand density, distribute the crop trees more evenly over the growing site, and create more growing room.

Tree Farm License: Relatively long-term (25 years) tenure agreements between the Provincial government and forest companies that provide responsibilities for forest management within a specified area. These area-based tenures grant rights to a licensee to manage forest resources according to a Management and Working Plan prepared by the licensees and approved periodically by the Chief Forester of the Province.

APPENDIX TWO

NEWSLETTER

RESOURCE MANAGEMENT

Okanagan
Timber Supply Area
Resource Planning

Water

Fish

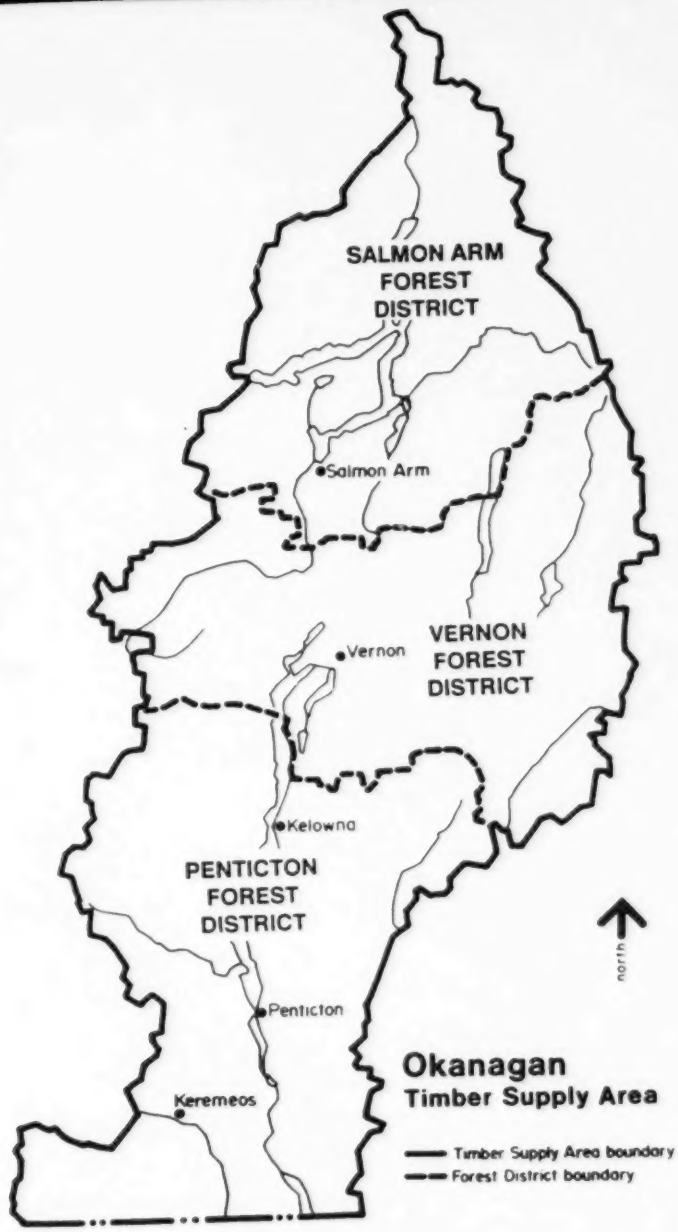
Wildlife

Recreation

Range

Timber

People



An Invitation to Participate

The Ministry of Forests is developing plans for the management of natural resources in the Okanagan Area. Open Houses will be held to:

- Describe the Planning Process.
- Identify and discuss issues affecting Natural Resource Management in the Okanagan.

Province of British Columbia
Ministry of Forests

The Planning Process

"Integrated Resource Management" or "IRM" is the process of planning for the management of all natural resources in an area. These natural resources include, among other things, water, trees, soil, wildlife, and fish.

The Ministry of Forests has designated the area shown on the front of this Newsletter as the "Okanagan Timber Supply Area". It is the reponsibility of the Ministry of Forests to manage the timber, range and recreation resources in the Okanagan and to ensure full consideration of water, wildlife, fisheries, soil and a broad range of social issues such as jobs, community stability, community water supplies and many other important issues. Integrated Resource Management involves the public in the planning process.

Steps in the Planning Process

Step 1 **Prior to June 18**

Maps prepared and Issues identified by the Forest Service.

Step 2 **June 18 to June 27**

Public meetings held around the Okanagan/Shuswap area to discuss the planning process and important resource issues (see back page of this Newsletter).

Step 3 **by July 31**

A Draft "Options" Report prepared considering a broad range of issues affecting timber, range and recreation management and incorporating results of the public meetings.

Step 4 **by August 31**

The Chief Forester of the Ministry of Forests reviews the draft report to ensure that all issues are considered.

Step 5 **Sept. 1 to Sept. 30**

The "Options" developed in Step 3 will be presented to the public for discussion, with a broad range of alternatives for people to consider.

Step 6 **by October 31**

The final "Options Report" incorporating public preferences will be presented to the Chief Forester so that he can determine a harvest level for timber and set recreation and range objectives. In selecting management alternatives, he will use the Options Report, other technical information from the Ministry of Forests, from other government agencies and from public input.

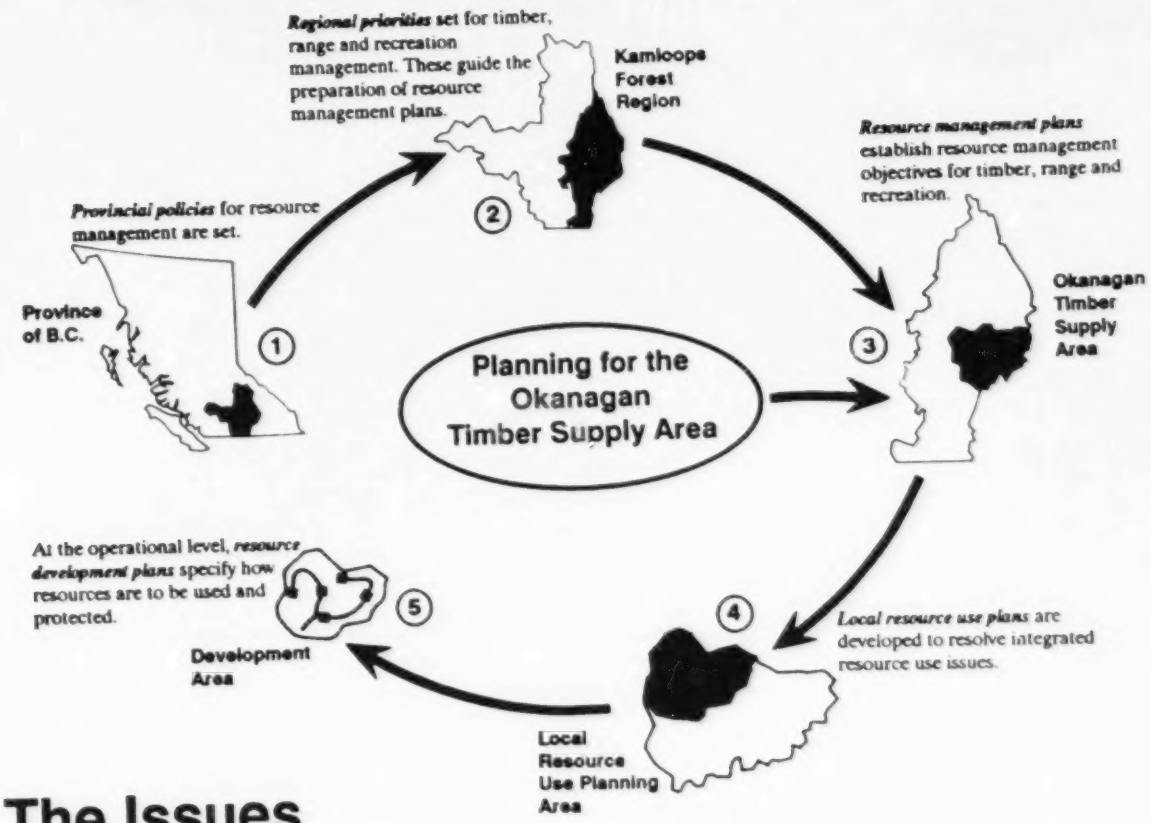
Step 7 **Nov. 1990 - June 1991**

Once the Chief Forester has set timber, range and recreation objectives, the Ministry will develop a "Resource Management Plan" for the area. This will define in more detail where and how the timber, range and recreation resources will be managed ensuring consideration of the Issues identified during the public meetings in Step 2 and 5.

Step 8 **On-going**

The planning process is on-going, responsive to society's attitudes and preferences as different issues become more or less important.

Resource Management Plans and the Ministry's Planning Framework


Regional priorities set for timber, range and recreation management. These guide the preparation of resource management plans.
Kamloops Forest Region
Resource management plans establish resource management objectives for timber, range and recreation.
Provincial policies for resource management are set.
Province of B.C.
Okanagan Timber Supply Area
Planning for the Okanagan Timber Supply Area
At the operational level, *resource development plans* specify how resources are to be used and protected.
Development Area
Local resource use plans are developed to resolve integrated resource use issues.
Local Resource Use Planning Area
1
2
3
4
5

The Issues

The following have been identified by the Forest Service as important resource management issues that will have a social, environmental and economic impact on future development in the Okanagan/ Shuswap. At the Forest Service Open Houses (See back page) these and other issues will be discussed in detail.

Community Expansion and Population Growth

- Projected growth over next 20 years and effect on the forest land base

Water and Watershed Protection

- Increased demand for water and the effect on forestry, range and recreation

Fish and Wildlife Habitat

- Critical fish, wildlife and bird habitat and effect on forest management
- Wildlife conservation

Outdoor Recreation and Tourism

- Increased demand for public and commercial recreation and wilderness areas
- Increased demand for natural landscapes

Range and Cattle Grazing

- Range management problems
- Increased demands for accessible range
- Increased urbanization
- Range sharing with wildlife

Timber

- Areas with harvesting problems and low timber quality
- Mountain Pine Beetle and other volume losses
- Reductions to the Forest Land Base
- Future supply and access
- Distribution of timber supply and demand
- Effects of clear-cut, shelterwood and selective logging systems

Silviculture and Reforestation

- Silviculture and the long term effect on timber supply
- Reforestation problems
- Funding for silviculture

Future Demands from Industry/ Commercial Users

- Agricultural land
- Forest industry demand for timber
- Mining
- Industrial areas
- Access corridors
- Commercial recreation and tourism
- Other

Slash burning/smoke management

- Slash burning and smoke control

Oldgrowth and Biodiversity

- Conservation of representative ecosystems

These issues and others are being considered and discussed. If you are concerned about the natural resources in the Okanagan and want to influence future plans for the management of these resources, the Ministry is asking for your input.

The Planning Process and Resource Issues will be discussed at these Open Houses:

Kelowna
June 18th, 19th
Lodge Motor Inn
2170 Harvey Ave.

Keremeos
June 21st
Victory Hall
727 7th Ave.

Salmon Arm
June 26th & 27th
Community Centre
2450 Trans Canada Hwy. N.E.

Penticton
June 20th
Penticton Trade and Convention Centre
273 Power St.

Vernon
June 22nd, 23rd*
Vernon Lodge Hotel
3914-32nd St.

Open House Hours:
12 pm to 8 pm
***Vernon June 23rd - 9am to 1pm**

Want More Information?

Phone-In Information Centre - open June 6 - 27
Noon to 8 pm, Monday to Saturday
For toll free information call: 1 800 667-8733

Newsletter prepared by SOFOR Consultants Ltd, Victoria

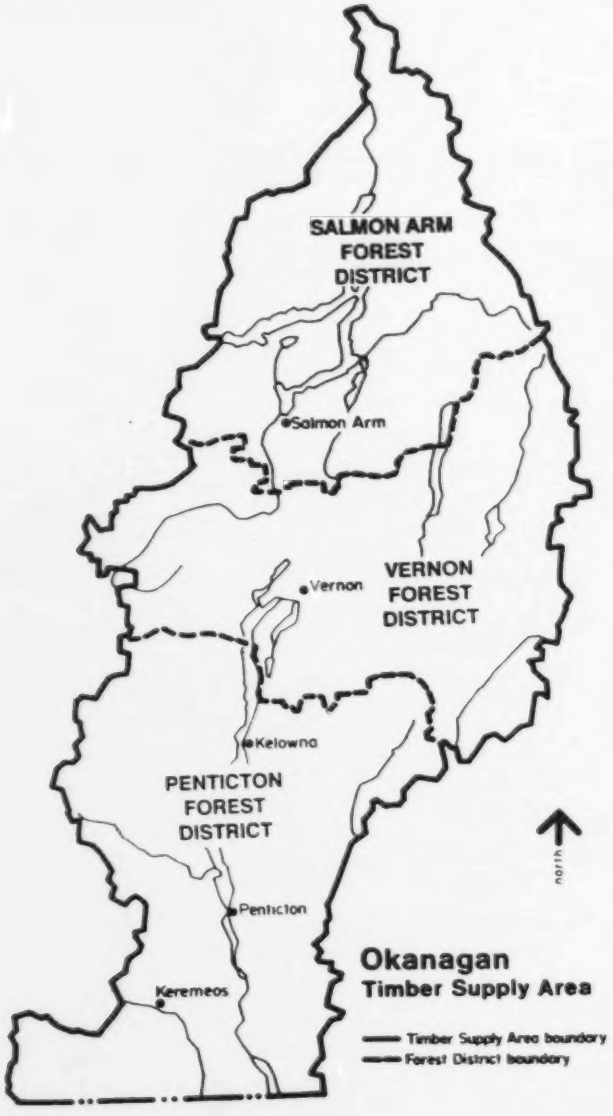
APPENDIX THREE

QUESTIONNAIRE

RESOURCE MANAGEMENT

Okanagan
Timber Supply Area
Resource Planning

What Are Your Concerns?



This is an opportunity to express your concerns and views regarding resource management in the Okanagan/ Shuswap area. Please fill out this questionnaire and/or submit a written presentation so that you have input into the planning process.

Your views and concerns will be considered in the preparation of the Options Report for the Okanagan TSA. All questionnaires and briefs will be presented with the Options Report to the Chief Forester of the province for his consideration in setting harvest levels for timber, and recreation and range objectives.

Province of British Columbia
Ministry of Forests

Resource Management Issues

Each of the issues identified below affects the long term management of the resources under the Ministry of Forests mandate; timber, range and recreation.

Which of these issues are you most concerned about? How do you think integrated resource management should be developed to deal with these issues?

Please check the level of importance and write in your views on how these issues should be handled.

Population Growth and Changing Land Uses High ☐ Medium ☐ Low ☐

Water and Watershed Protection High ☐ Medium ☐ Low ☐

Fish and Wildlife Habitat Protection High ☐ Medium ☐ Low ☐

Outdoor Recreation High ☐ Medium ☐ Low ☐

Timber Production and Forest Industry Jobs High ☐ Medium ☐ Low ☐

Silviculture and Reforestation High ☐ Medium ☐ Low ☐

Protection of Naturally Appearing Landscapes High ☐ Medium ☐ Low ☐

Slash Burning and Smoke Management High ☐ Medium ☐ Low ☐

Old Growth and Biodiversity Preservation High ☐ Medium ☐ Low ☐

Preservation of Wilderness Areas High ☐ Medium ☐ Low ☐

Range and Cattle Grazing High ☐ Medium ☐ Low ☐

Economic Expansion in the Okanagan/Shuswap High ☐ Medium ☐ Low ☐

What other natural resource issues are important?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Information about you:

It will help us in our planning to know who attended the Open House and responded to the questionnaire.

Where do you live? _____

In Town ☐ or Rural? ☐

What did you like about the Open House?

_____

_____

How could it be improved? _____

_____

_____

What do you do for a living?

Forest Industry ☐

Ranching ☐

Farming ☐

Recreation or Tourism ☐

Service Industry ☐

Manufacturing ☐

Government ☐

Professional ☐

Other _____

You can leave the questionnaire or written presentation at the Open House or mail by August 31 to:

Resource Information Centre
Ministry of Forests, Vernon District
2501 - 14h Avenue,
Vernon, B.C. V1T 8Z1

Newsletter prepared by SOFOR Consultants Ltd, Victoria

APPENDIX FOUR

RESPONSE TO ISSUES

POPULATION GROWTH AND CHANGING LAND USES

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. As the population grows there must be strict legislation to protect natural areas, particularly critical wildlife habitats.	3	6		3	4	12	28
2. Devise longterm plans that accomodate an increase in population as well as changing social concerns.	2	3	3	7	1	10	26
3. Restrict the use of agricultural land for residential developments.	7	3	1	6	2	7	26
4. A Provincial landuse strategy is needed to group compatible uses into zones and priorize uses within zones.	4	4		2	1	8	19
5. Concern about water quantity and quality with an increasing population.	5	7				3	15
6. Population growth is inevitable and not a concern.	2		2	4	1	3	12
7. Restrict growth.	2	1	1	4	1	2	11
8. Enforce planned landuse on private establishments.				1	5	1	7
9. Increase population densities.		1		2	3	1	7
10. Establish planning committees at the local government level.	3			2		2	7
11. Educate the public on responsible landuse in both the urban and natural environment.	1			2		3	6
12. There is a need for a resource inventory in order to monitor changes over time.	1	1				2	4

WATER AND WATERSHED PROTECTION	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Watershed quality and quantity are the most important issues within the Okanagan TSA.	11	8	3	10	6	14	52
2. Allow only low impact logging in watersheds, eg. selection logging.	10	3		10	2	15	40
3. Establish a multi-agency task force to address planning ie. road maintenance, recreation use, etc. wtihin community watersheds.	3	4	2	2	4	6	21
4. Provide strict monitoring and control over activities within community watersheds and issue penalties for infringement.	4	4	1	2	2	7	20
5. There should be no logging in the watersheds - reduce the AAC if necessary.	2	5		4	1	5	17
6. Remove cattle from community watersheds.	2	4	1	1		3	11
7. Create buffer zones around community water supplies.	3			2	2	3	10
8. Restrict public access into the watersheds (ie. hunters, motorboaters, ATV users etc.).	3	2			1	1	7
9. Restrict herbicide use around water sources.	1	1		1	1	2	6
10. Watersheds are currently well managed and protected.				2		3	5
11. Conduct a biophysical inventory of the watersheds.	2	1				2	5
12. Initiate site specific plans within each watershed.	1	1		1		2	5

FISH AND WILDLIFE HABITAT PROTECTION

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Provide more parkland for species preservation ie. preserve for intrinsic values, not for hunting purposes.	7	6	2	4	5	11	35
2. Encourage site specific logging practices ie. allow only selection logging in critical locations such as riparian areas.	5	6		6	2	8	27
3. Preserve biological corridors and preserve representative areas within each watershed.	4	1	2	1	2	8	18
4. Fish and wildlife can co-exist with logging operations.	4	1		7		2	14
5. Create buffer zones around riparian areas.	2	1	1	1	1	6	12
6. Conduct an inventory of all species in order to monitor any changes and to assist in planning.	2	1		1	2	5	11
7. Allow no clearcutting.	2	5		1		2	10
8. Educate the public about wildlife preservation and the concept of 'shared landuse'.	4			3	1	1	9
9. The present system of protection is satisfactory.	1			4		3	8
10. This issue is important for maintaining the tourism industry.		1	1	2	1	2	7
11. Place fish and wildlife protection before jobs and economy.		1		1		4	6
12. Allow no hunting or trapping in Provincial parks.	2				1	3	6
13. Place restrictions on the size, design, and distance between cut blocks.	1	1		1		2	5
14. Protection of fish and wildlife should not occur at the expense of the AAC.	1			1		2	4

OUTDOOR RECREATION	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Restrict and monitor pedestrian and vehicular access (eg. ATVs snowmobiles, etc.) into sensitive areas (eg. watersheds).	15	6	1	10		10	42
2. Zone areas to prevent conflict between different recreation activities.	3	3	1	5	1	8	21
3. Recreation and forestry are compatible - ie. access via logging roads.	4	1		4	3	4	16
4. More wilderness areas should be allocated for recreation.	4	1	3		1	6	15
5. Recreation areas will become increasingly important to the tourism industry.	1	2	1	2		6	12
6. The demand for recreation areas will increase as the population grows.	3	1	1	2		4	11
7. Educate the public on proper use of recreational areas.	2			4	2	2	10
8. Recreation should not preclude other landuses ie. logging.	1			2		3	6
9. There is a need for visual landscaping.	1	1			2	2	6
10. There are currently enough areas for recreation.	2	1				3	6
11. Historic trails should be protected and buffer zones maintained.	2	1		1		1	5
12. Logging roads should remain accessible to the general public.		1		1		1	3
13. The Ministry of Parks should assume responsibility for high profile sites.				1		2	3
14. There should be unrestricted access to Crown land for recreation purposes.	2		1				3

TIMBER PRODUCTION AND FOREST INDUSTRY JOBS

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. There should be a slow deliberate reduction of the AAC in order to reduce the falldown effect and minimize job losses over the longterm. Ensure sustainability of the industry - mill capacities should match timber supply.	12	4	2	5	5	22	50
2. The forest industry is the mainstay of the economy.	6	3	3	8	1	5	26
3. Encourage more value-added manufacturing and diversification of the industry.	6	5		4	6	4	25
4. Place a heavy emphasis on reforestation.	3	3		8	1	9	24
5. Other resource values should not take priority over logging.	3	3		12		3	21
6. Maintain the current AAC.	4	2		2	2	6	16
7. Increase manpower by reducing automation in the industry.	3	3	1	1		5	13
8. Place a greater empahsis on selection logging.	3	2		2		3	10
9. Monitor companies more strictly.	1	4	1	2		1	9
10. Jobs should not take precedence over legitimate environmental concerns.	2		1	1		4	8
11. Reduce timber production to accomodate other uses. Timber will decline next to the retirement and tourism industries - move away from a resource based economy.	3			2		2	7
12. Increase public awareness concerning the importance of forestry to the Provincial economy,	1	1			2	2	6
13. Eliminate clearcutting.	1			2		1	4
14. Eliminate subalpine, alpine and watershed logging.	1					2	3
15. Give more committment to research.		1				2	3
16. Produce a forest practices act.							

SILVICULTURE AND REFORESTATION	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Plant all disturbed sites promptly and address backlog.	17	7	2	9	4	13	52
2. This issue has priority over all other issues.	3	6	2	8	3	12	34
3. Both issues are essential for the stability of the industry and its economic survival.	9	2	1	6		8	26
4. Monitor company reforestation projects stringently and provide incentives for proper silviculture practices.	2	4		7	4	9	26
5. Encourage systems that promote natural regeneration and maintenance. Reduce clearcutting to allow this.	1	3		4	3	5	16
6. Plant diverse species and produce different aged stands.	2	2	1	4		6	15
7. Continue planning and research in this area.	2	2	1	3	2	4	14
8. Ensure the survivial of seedlings - provide follow-up maintenance.	3	1	1	2		3	10
9. Continue providing public education.	2	1	1	2	1		7
10. Band the use of herbicides in site treatement.				2		4	6
11. Keep cattle off new plantations.	2			1		1	4
12. Slow rates of growth must be considered such that the AAC does not exceed tree production - achieve a sustained yield.		1				3	4
13. The existing basic silviculture will not keep up with the need to achieve the long run sustained yield.		1	1	1		1	4
14. Silviculture tools such as slashburning and herbicide use must be maintained.	2			1			3

PROTECTION OF NATURALLY APPEARING LANDSCAPES	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Allow no clearcuts in highly visible areas. Preserve areas of high scenic quality.	7	4	1	12	4	7	35
2. It is important to maintain the image of 'Supernatural B.C.' for the tourism industry.	2	4	2	3	1	15	27
3. Modify the cut design of clearcuts to minimize their visual impact and replant immediately.	5	3	1	10	3	3	25
4. Visual concerns should be addressed but not at the expense of forestry activities except in high tourist areas.	4	3	1	5	1	8	22
5. Eliminate clearcuts in favour of selection logging.	4	1		3	2	10	20
6. The issue of 'naturally appearing landscapes' and what is aesthetically appealing is highly subjective.	5	3	1	3	1	7	20
7. Educate the public to appreciate different forestry practices.	2	3		2	3	2	12
8. Clearcut in visible areas so the public can monitor industry activities.	1	2		2	2	4	11
9. The industry should practice aesthetic logging to improve its public image.	4		1			3	8
10. Properly logged areas are more 'attractive' than wildfire or pest infected sites.	2			1		4	7

SLASH BURNING AND SMOKE MANAGEMENT

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Find alternatives to slash burning ie. composting, chipping, mulching, etc. All slash should be handled manually to reduce air pollution.	20	11	4	16	12	28	91
2. Slash burning is an essential silviculture tool.	7	3	2	12	9	31	64
3. Concern about air pollution causing inversions, contributing to the greenhouse effect, and causing health problems.	8	6	1	8	6	9	38
4. Burn within the best venting time periods.	6	3	1	6		5	21
5. Keep slash burning to a minimum - selection log.	2	1		3		6	12
6. Burn slash, but not as a general prescription.	1			2	2	2	7
7. Educate the public about the necessity of slash burning.	3	1				2	6
8. Reduce the size of the cut blocks to reduce the amount of smoke produced.		1		3		1	5
9. Continue air quality studies and research.		2				1	3

OLD GROWTH AND BIODIVERSITY PRESERVATION

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Preserve representative old growth ecosystems in each biogeoclimatic zone for study and for future generations.	17	12	2	16	8	26	81
2. Selectively log these areas, but on a long term basis.	2	3		11		7	23
3. Develop guidlenines for the inventory and monitoring of biological diversity that will assist in developing management plans.	5	3		3		5	16
4. Old growth is a non-issue. These trees should be logged at some point as their death is inevitable.	1	2	1	7		5	16
5. There are enough old growth parks currently set aside.	4	1	1	3		3	12
6. They are important for maintaining genetic diversity in the natural environment.	2	2		3		5	12
7. Some representative stands should be left for comparison to logged areas.	1			3	1	2	7
8. It is important to maintain different aged stands.				1		2	3

PRESERVATION OF WILDERNESS AREAS

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Wilderness areas must be large enough to preserve the ecological integrity of the area and be protected by legislation which establishes boundaries, restricts human access, and provides buffer zones.	7	8	3	5	1	10	34
2. A balance should exist between the different uses desired of the forest land base.	7	4	1	5	1	13	31
3. There are enough wildernesss areas.	7	2		13		6	28
4. Recommend that 10-15% of B.C.'s land base be set aside for wilderness preservation - for future generations.	4	6	1	3	1	7	22
5. Expand the parks system.		5		6	1	8	20
6. Identify and inventory potential areas as well as forest types to determine preservation policies.	1			1	2	7	11
7. Wilderness areas are important for the tourist industry as well as for the individual well-being.	2			3		4	9
8. Such areas are important for maintaining biodiversity.	1	1		1	1	3	7
9. Wilderness is important, particularly near high population densities.	1	1		1	1	1	5

RANGE AND CATTLE GRAZING	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. Grazing should be restricted in watersheds, at high elevations, in new plantations, in wilderness areas, and on other senitive sites.	10	16	1	12	5	16	60
2. If managed properly, forestry and grazing can be mutually beneficial. Grazing is acceptable at current levels.	10	5		13	2	11	41
3. The range resource is currently poorly regulated and is in direct conflict with recreation, wildlife management and silviculture. Grazing results in land degradation.	1	2		3	4	8	18
4. Range users must be held more accountable for their use of the land. There needs to be more planning and monitoring by the Ministry of Forests.	2	3	1	4	1	4	15
5. Costs far surpass any economic return from cattle. Grazing should therefore not be pursued at the expense of other activities.	3	1	1	3		4	15
6. Grazing leases should be strictly limited.		1	1	2	1	4	9
7. Grazing should be limited to privately owned lands.	1			2		2	5
8. Fence community watersheds to protect water sources		1			1	3	5

ECONOMIC EXPANSION IN THE OKANAGAN/SHUSWAP

	Kelowna	Penticton	Keremeos	Vernon	Salmon Arm	Mailed	Total
1. The economy should diversify into secondary and service oriented industries such as value-added products, the recreation, tourism and retirement sectors.	6	5	4	7	4	21	47
2. Economic expansion must be ecologically sustainable with new methods and new industries developed to preserve the present quality of life. Encourage the development of compatible industries ie. clean industries.	5	3		3	9	11	31
3. Economic development should be slow and sustainable.	3	5		8	1	8	25
4. There should be no economic expansion.	3	3	1	2	3	5	17
5. Develop a regional plan for expansion and directed growth.	2	2	1	1	1	7	14
6. Forestry should take precedence over any other industry - it is still the mainstay of the economy.	2	2		6		3	13
7. Development must not occur on agricultural land.	2			3	2	3	10
8. Maintain the current rate of growth.	1	1	1		1	3	7
9. Ensure commmunity based wood processing rather than foreign owned.				1	2	1	4